FINANCIAL INTEGRATION, BANK PERFORMANCE AND ECONOMIC GROWTH IN AFRICA

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By

KANNYIRI THADIOUS BANYEN

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SUPERVISOR: PROFESSOR NICHOLAS BIEKPE

DECLARATION

I, Kannyiri Thadious Banyen, hereby declare that the research reported in this thesis is my own original piece of work, except where acknowledgements indicate otherwise. I further declare that this thesis has not been submitted previously, either in part or its entirety for a higher degree or qualification at any other university or institute of higher learning. I authorize the University of Cape Town to reproduce either in part or whole, the contents of this thesis in any manner whatsoever, for the purposes of teaching and learning.

Kannyiri Thadious Banyen Signed by candidate 14th June, 2019.

ABSTRACT

The finance-growth literature identifies financial integration as a vital catalyst for driving the growth performance of both nascent and advanced economies. Financial integration is viewed as a process by which technology and capital is mobilized and efficiently distributed across national borders to enhance consumption, investments and output growth. However, the benefits of financial integration for economic growth are not unanimous and sometimes evade even the most advanced economies. To promote economic growth, financial integration is required to stimulate competition and efficiency in domestic banking markets without eroding bank profitability or stability. Understanding the effects of deeper financial integration on the conduct and performance of banks and economic growth therefore forms the central theme of this thesis. The study employs several panel data estimation methods to test these hypotheses using data from 405 banks across 47 African countries over the period 2007-2014 and compares the results for five sub-regional markets.

The findings reveal that deeper financial integration has significant positive effects on overall bank profitability in Africa. Specifically, the study finds that financial freedom and cross-border banking enhance bank profitability in Africa and across the regional economic communities. The study finds that higher operating cost in the 2007-2014 period reduced bank return on assets but increased overall bank profitability. This reflects the need for banks in underdeveloped banking markets to increase their diversification, expansion and advertising costs in periods of integration and rising competition to ensure overall profitability. The study also finds a direct negative relationship between deeper financial integration and competition changes on bank stability. However, the findings support a U-shaped relationship between competition and bank stability, suggesting that beyond certain thresholds, higher competition will induce greater stability in Africa's banking markets. This study, therefore, identifies deficiency of competitiveness as a fundamental variable hindering emerging markets from enjoying the stability benefits of financial integration. Quality regulation and control of corruption are also identified as vital factors for improving bank stability in Africa. The study further shows that financial integration enhances competition, efficiency and bank lending behavior in Africa, resulting in banking convergence in Africa and the regional economic communities. In examining the causal nexus between competition and bank efficiency, the results support the quiet-life hypothesis in Africa, especially in the EAC and reject the quiet-life hypothesis in the AMU and ECCAS sub-regions. The study further finds evidence of the efficient-structure hypothesis in Africa, especially in the AMU and SADC sub-regions. Also, though the study finds no significant nexus between financial integration, bank lending and economic growth in Africa, the evidence supports the feedback

hypothesis in the EAC while the supply-leading hypothesis is supported in the AMU, ECCAS and ECOWAS sub-regions. Also, while a positive causal nexus from financial integration to economic growth exist in the AMU sub-region, this relationship is negative in the ECCAS sub-region. Overall, the results suggest that the effect of financial integration on bank performance and economic growth vary significantly across the regional economic communities of Africa. It is, therefore, imperative for bank managers, regulators and policy makers to pursue tailored interventions for each regional economic community while exploiting opportunities for inter-REC collaborations and peer-learning for Africa's gross integration and growth.

DEDICATION

This thesis is dedicated to my parents, Lawrence Banyen and Marceline Gbiel, my uncle, Justice Simon Gbiel Suurbaareh, my wife, Benedicta Banyen and my two daughters, Mwininkoma Banyen and Maaloo Banyen for their prayers, sacrifices, encouragement and constant support through the years.

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AEC	African Economic Community
AMU	Arab Maghreb Union
BPI	Bank profitability index
COMESA	Common Market for Eastern and Southern Africa
CU&B	Central Europe and the Baltics
E&CA	Europe and Central Asia (developing only)
EAC	East African Community
ECCAS	Economic Community of Central African States
ECOWAS	Economic Community of West African States
ES	Efficient Structure hypothesis
EU&CA	Europe and Central Asia (developing only)
EU	Euro Area
FDI	Net inflows of foreign direct investment (% GDP)
FE	Fixed effects
FI	Financial freedom index
FSD	Financial sector development
GDP	Gross domestic product
GDPG	Gross domestic product growth rate per annum
GDPGPC	Per capita gross domestic product growth rate per annum
GDPPC	Per capita gross domestic product
GMM	General method of moments
HHI	Herfindahl-Hirschman Index
INTFI	International cross-border banking
LA&C	Latin America and Caribbean (developing only)
LI	Lerner index
ME&NA	Middle East and North Africa (developing only)
MENA	Middle East and North Africa region
MMR	Martínez-Miera and Repullo (2010) theory
MMSC	Model and moment selection criteria

NA	North America
NIM	Net interest margin
NON	Non-interest income margin
NPL	Nonperforming loans
OAU	Organization of African Unity
OLS	Ordinary least squares
PCA	Principal components analysis
pVAR	Panel vector autoregressive model
RE	Random effects
RECs	Regional economic communities
REGFI	Regional cross-border banking
ROA	Return on assets
ROE	Return on equity
SA	South Asia
SADC	Southern Africa Development Community
SBPI	Standardized bank profitability index
SCP	Structure-Conduct-Performance hypothesis
SSA	Sub-Saharan Africa
WDI	World Development Indicators Database

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

The debate about the economic benefits of financial integration stems from a longstanding debate on the nexus between finance and economic growth. This debate has attracted a lot of research interest due to the critical role played by financial institutions in the economy. According to Baele et al. (2004), financial integration is the state when, or the process of ensuring that all potential financial market participants in a given region, common market (or globally) share similar traits, such as facing identical regulatory environments, having equal access to a set of financial products and being treated equally when they are active in the market. Therefore, a deeply-integrated financial system promotes market freedom, harmonization and greater flow of capital and institutions across and within national borders. Berg and Krueger (2003) therefore assert that accurate appraisal of the policy and practical implications of the relationship between finance and economic growth, based on sufficient empirical evidence, has far-reaching implications for the wealth of nations.

Theoretically, it has been argued that financial sector development promotes output growth and economic development (Bagehot, 1873; Schumpeter, 1911). According to the World Bank (2018), financial sector development is the state or process of reducing the costs of financial transactions through enhanced and cheaper information acquisition, contract determination and contract execution among counter parties in financial markets. In view of this, Bagehot (1873) theorized that the existence of large and well-developed capital markets promotes efficient distribution of capital to relevant productive investments for higher economic growth. Schumpeter (1911) popularized this theory in a seminal paper which highlighted the domestic revenue mobilization and growth-critical allocation roles played by banks in an economy. This supply-leading view emphasized that a deep, liquid and diversified financial system improves economic stability and enhances economic growth through efficient resource allocation. In line with this, King and Levine (1993) explained that financial institutions facilitate real output growth by reducing information asymmetry, transaction cost and the risk involved in resource allocation in an economy. Therefore, banks increase capital accumulation and distributive efficiency in an economy and create the macro-economic framework needed to stimulate economic efficiency and growth.

In contrast, several studies[1] provide evidence to back the demand-following hypothesis of Robinson (1952) which stipulates that economic growth precedes financial sector development while a third view presents evidence of a so called 'feedback' effect, where causality runs in both directions (Pradhan et al., 2014). However, Andersen and Tarp (2003) noticed that limiting the samples to Africa and Latin America results in an inverse relationship between financial sector development and economic growth. In view of this, most developing countries in Africa and other regions operated tight monetary regimes characterized by repressive legislation and restrictive policies until the late 1970s (Stiglitz, 1993). These restrictive policies were aimed at promoting industrial growth and financial stability, among others. However, McKinnon (1973) and Shaw (1973) observed that government intervention and financial repression impacts negatively on the distributive efficiency of financial markets and constrains economic growth (Andries and Capraru, 2013). Therefore, following a broad assertion about the positive nexus between financial sector development and output growth, most emerging economies started implementing reforms to liberalize their financial markets, stimulate competition and promote better distributive efficiency (Pradhan et al., 2014). This, however, did not start in Africa until the mid-to-late 1980s.

The liberalization of financial markets in Africa triggered a paradigm shift in the pattern of financial market activities on the continent and promoted regional and international financial integration among African countries (African Development Bank, 2010; Beck et al., 2014; Leon, 2016). According to Claessens and van Horen (2014), Africa's banking sector saw a surge in cross-border activities, with banks setting up subsidiaries and branches in other countries (Diallo, 2016). These transformations have the potential to enhance financial deepening and promote economic growth through increased lending and investments (Leon, 2015). However, Beck et al. (2014) and Motelle and Biekpe (2015) opine that deeper financial integration and cross border banking in Africa could also increase financial fragility and adversely affect economic growth. Therefore, financial integration in Africa has implications for the conduct and performance of financial intermediaries in the region, which in turn, affects economic growth and development.

Generally, it has been argued that financial integration and financial market development have a positive effect on financial intermediary performance, financial stability, and economic growth (Hewartz and Walle, 2014). According to Ahmed and Suardi (2009), integration results in effective consumption smoothing through increased competition and efficient resource allocation. This assertion is based on the view that

[1] Panopoulou (2009); Kar et al. (2011) among others

increased competition resulting from financial integration reduces the franchise value of banks, providing an incentive for them to pursue efficiency goals as a means to remain profitable (Boyd and De Nicolò, 2005; Weill, 2013). According to Berger (1995) the reduction in franchise value also stimulates financial intermediaries to seek out new clients in previously untapped or underserved markets in their bid to stay profitable in an increasingly competitive market (Buch and Heinrich, 2003). This increases bank lending activities to the private sector and encourages innovation and investment activities. Therefore, Demsetz (1973) concludes that financial integration has the potential to increase the productivity of capital and spur economic growth in developing countries. In contrast, Marcus (1984) argues that increased financial integration-inducted competition drives banks towards increased risk-taking behavior[2] which has negative implications for the profitability of financial intermediaries and the growth performance of an economy. Besides, increased competition affects the pricing power of banks, reduces their lending rates and negatively affects their profitability. Therefore, Ghosh (2016) suggests that financial integration could enhance banking efficiency but reduce bank profitability. This is possible where the loss of pricing power and reduction in intermediation spreads outweighs the efficiency gains from a higher competition.

In view of the ongoing assertions, the pursuit of financial integration in Africa raises several important concerns about its potential effects on the competitive conduct and performance of financial intermediaries as well as the effects of these outcomes on the growth performance of African economies. This underscores the need for continuous studies on the effects of Africa's integration and the interaction between financial markets and the real sector for better policy formulation.

1.2 Research problem and motivation for the study

The role of banks in the economy cannot be overemphasized, especially in Africa and similar regions characterized by bank-dominated financial systems. Generally, banks have been noted to facilitate economic growth by reducing information asymmetry between surplus and deficit spending units (Masood and Ashraf, 2012). This ensures effective intermediation and efficient resource allocation. The health and wealth of financial intermediaries in Africa is therefore crucial for the ultimate development of the continent (Chen and Liao, 2011; Athanasoglou, et al., 2008). However, the continuous pursuance of deeper financial

[2] See Levy-Yeyati and Micco (2007); Jimenez et al. (2013) for evidence supporting this franchise-value hypothesis

integration[3] in Africa and the expansion of cross-border banking activities present banks with new opportunities and threats that could affect their ability to contribute positively to economic growth and development.

According to Klein and Weill (2016), the ability of banks to contribute significantly to economic growth depends on how efficiently and profitably they manage the growth-risk nexus of their core business of lending to promote consumption and investment activities in the economy. Besides, a profitable banking system is better able to withstand shocks and provide needed consumption and investment funds to stimulate economic recovery and growth (Athanasoglou, et al., 2008). Therefore, understanding the nexus between financial integration, its effect on the competitive conduct of banks and their profitability is a crucial exercise for optimal policy formulation, especially in bank-dominated financial markets. Also, achieving greater competition and efficiency enhances the ability of banks to offer more diversified portfolios of assets at lower costs to economic agents, thereby promoting greater investment activities and economic growth (Chen and Liao, 2011; Love and Peria, 2015; Klein and Weill, 2016). This thesis therefore tests the central hypothesis that deeper financial integration improves the competitiveness, efficiency, profitability and stability of banks in emerging markets, enhances bank lending behavior and promotes economic growth.

Over the years, several studies have attempted to understand the drivers of bank profitability in Africa (Qin and Dickson, 2012; Francis, 2013). However, these studies failed to account for the effect of financial integration on bank profitability across Africa. Also, studies examining the effect of financial integration on bank profitability in emerging economies largely employ one of several measures of bank profitability in their analysis without accounting for its effect on overall profitability, limiting the interpretation and policy application of their findings. Besides, the literature on Africa is sparse and offers no evidence of the bank performance outcomes of financial integration in the context of the regional economic communities which form the foundations of Africa's regional integration drive. It is therefore crucial to employ a standardized composite measure of bank profitability similar to that in Luo et al. (2017) to examine the comparative effects of the varying integration efforts across Africa's regional economic communities. To the best of the author's knowledge, no study on Africa has investigated this comprehensively. This study offers to fill the gap using evidence from the Arab Maghreb Union (AMU), East African Community (EAC), Economic Community of Central African States (ECCAS), Economic Community of West Africa States (ECOWAS)

[3] Where regulatory and other conditions in the banking markets will be so closely identical that pricing of financial assets will be uniform across national borders.

and the Southern Africa Development Community (SADC)[4]. This comparative assessment is expected to deepen the empirical understanding of the role of both *de jure* and *de facto* financial integration in determining bank profitability in Africa.

Overall, deeper financial integration in Africa is expected to progressively remove entry barriers at the local and international levels to allow for increased capital mobility and cross-border participation. This is expected to stimulate competition and promote efficient resource allocation. However, increased banking competition has implications for the risk-taking behavior of financial intermediaries (Marcus, 1984). According to Buch, Koch, and Koetter (2013), financial integration affects the market structure of banks and reduces their market share. This stimulates risky lending practices as banks struggle to maintain their profit margins[5]. This has major consequences for the stability of banking markets and the real economy (Motelle and Biekpe, 2015). It is therefore imperative that bank management, regulators, and policy makers are continually provided with the empirical evidence on the effect of financial integration and resulting competition changes on bank risk-taking behavior in Africa. Against this background, this thesis offers to test the relationship between financial integration, competition changes and bank risk-taking behavior in Africa, with emphasis on the sub-regional differences across five regional economic communities. The effects of quality regulation and corruption are also assessed.

Also, competition changes resulting from deeper financial integration in Africa is expected to stimulate higher efficiency in the banking sector. The need to improve on the efficiency of Africa's banking systems serves to enhance the scope and scale of bank lending activities through cost-cutting innovations and other strategies. This highlights the need for a continuous empirical understanding of the nexus between competition and efficiency in Africa's banking markets. However, empirical studies on the competition and efficiency nexus of African banking sector are scanty and limited to the Quiet-Life hypothesis (Sarpong-Kumankoma et al., 2017). The evidence of possible bidirectional causality will guide regulators and bank managers in better policy formulation for greater bank efficiency, especially in a period of growing competition amid higher deregulation and cross-border banking. This thesis therefore addresses this gap by testing for reverse causality between bank competition and efficiency in Africa and five sub-regional markets.

[4] Details of the country composition of the sampled banks are arranged by REC in appendix 1.A.

[5] This is supported by empirical evidence from Broecker (1990); Keeley (1990); Jimenez et al. (2013).

According to Gertler and Gilchrist (1993), the interface between banking markets and the real economy is explained by the 'credit-view' which suggests that credit availability significantly affects aggregate demand in an economy. Therefore, banks can influence production and innovation through their lending activities, which affects output growth (Samolyk, 1991). However, the ability of banks to effectively perform this intermediation function largely depends on the profitability and risk inherent in their lending activities. According to Bernanke and Lown (1991), the deterioration in bank loan performance and its resultant effect on interest revenues clog the credit-channel and may result in a credit crunch. The resulting decline in bank lending usually precede a decline in aggregate economic output (Bernanke and Lown, 1991). Therefore, understanding the interrelationship between bank lending behavior and economic growth in the nascent economies of Africa becomes an important exercise to direct pro-growth monetary and regulatory policies which aim at translating the lending activities of banks into development. However, the 2008 global financial crisis raise some genuine concerns among developing countries about the desirability of financial integration and bank lending growth for their economic welfare. Key among these concerns is the need to know whether there are limits to the growth and stability benefits of deeper integration and financial sector development for emerging economies and whether some countries in Africa have reached this threshold. In view of recent efforts by various regional economic communities (RECs) in Africa to unify their settlement systems and promote deeper banking integration and cross-border capital flows, a study of the causal nexus between financial integration, bank lending behavior and economic growth in Africa is not only timely, but critical to guide the policy decisions of leaders and firms in these sub-regions.

Also, the African Union has nurtured the dream of harmonizing the activities of Africa's financial markets and institutions and promoting harmonious and accelerated economic development across the region since its establishment in 1963. Deeper financial integration and the convergence of the banking and other financial markets are therefore viewed as important markers of Africa's economic growth and harmonization process. According to Affinito (2011), banking convergence spurs real economic convergence among countries in a common market. Deeper financial integration in Africa is therefore expected to ensure that capital finds the most optimal uses for greater economic efficiency and growth. Besides, the numerous financial sector reforms and efforts made by Africa's regional economic communities to promote cross border banking and investment activities, highlights the need for policy makers to empirically understand the convergence properties of Africa's banking and real sectors. This will ensure more informed policies that accelerate the process of banking and economic harmonization in

Africa[6]. To the author's best knowledge, studies on Africa have failed to account for the convergence properties of the banking sector. This thesis addresses this gap by examining banking and real economic convergence in Africa and five regional economic communities.

In view of the above assertions, this thesis seeks answers to the following pertinent questions: What are the effects of *de jure* and *de facto* financial integration on bank profitability in Africa? How do financial integration and bank competition changes influence bank risk-taking behavior in Africa? What is the causal relationship between bank competition and efficiency in Africa? Is there banking and economic convergence in Africa? What is the causal nexus between financial integration, bank lending behavior and economic growth in Africa? Lastly, are there variations in these relationships across Africa's regional economic communities?

1.3 Research objectives

The broad aim of this thesis is to examine the relationship between financial integration, bank performance and economic growth in Africa and five sub-regional markets. More specifically, the study seeks to achieve the following[7]:

i. To examine the effect of financial integration on bank profitability in five regional economic communities of Africa;
ii. To assess the effect of financial integration and competition changes on bank risk-taking in five regional economic communities of Africa;
iii. To examine the direction of causality between bank competition and efficiency;
iv. To examine the causal nexus between financial integration, bank lending behavior and economic growth in five regional economic communities of Africa.

[6] The World Bank (2007) examined economic convergence in the East African Community and Economic Community of West African States while African Development Bank (2010) studied the Common Market for Eastern and Southern Africa; the Arab Maghreb Union and the Central African Economic and Monetary Community.

[7] Each research objective and associated hypothesis is well motivated by the ensuing arguments in the introduction and literature review sections of the related empirical chapters. Therefore, objectives i (H_1), ii (H_2) iii (H_3) and iv (H_4) are motivated in Chapters 3, 4, 5 and 6 respectively.

1.4 Research hypothesis

Based on the above stated objectives, the study seeks to test the following hypotheses:

H_1: Financial integration has a significant positive effect on bank profitability in Africa;

H_2: Financial integration has a negative effect on bank risk-taking behavior in competitive markets;

H_3: There is significant feedback causality between competition and efficiency in Africa's banking markets;

H_4: There is significant feedback causality between financial integration, banking sector development and economic growth in Africa.

1.5 Organisation of the study

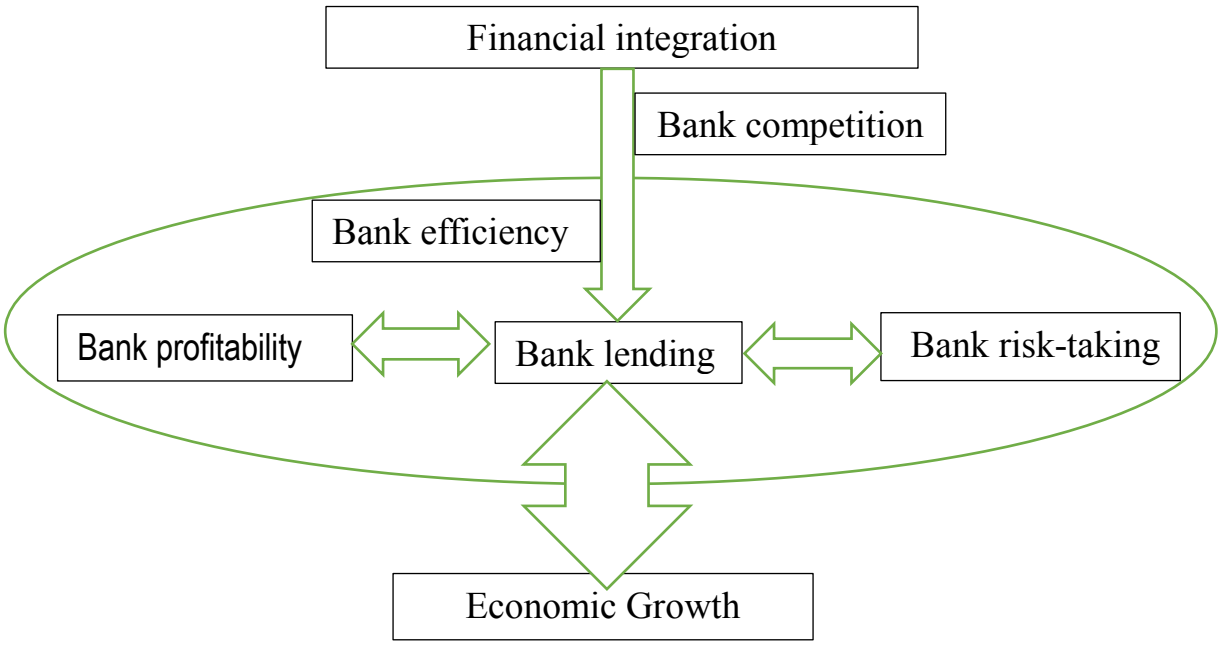
The thesis comprises seven chapters, four of which are empirical chapters. Chapter One provides a background and introduction of the study, outlining the identification and justification of the research problem, the objectives and hypothesis of the study as well as the chapter disposition. Chapter Two comprises an overview of relevant aspects of the financial sectors of Africa, with emphasis on the variations across the regional economic communities. The discussion covers seven thematic areas, namely: financial integration and banking sector development, market structure and competition, efficiency, profitability, banking stability and economic growth. The empirical chapters, spanning from Chapters Three - *Six* are conceptualized along the framework in Figure 1.1, which illustrates the theoretical relationships between the concepts under study: financial integration, bank competition, efficiency, profitability, risk-taking behaviour, lending behaviour and economic growth.

In Chapter Three, the thesis employs several dynamic panel data estimation methods to test the hypothesis that bank profitability in emerging markets is positively affected by financial integration. This was done using both *de jure* and *de facto* measures of financial integration and a composite measure of bank profitability constructed using principal components analysis in line with Luo et al. (2017). In addition, the chapter examines this relationship across five regional economic communities of Africa. In Chapter Four, the thesis tests the hypothesis that there is a significant inverse relationship between financial integration and bank risk-taking behaviour in competitive banking markets using the fixed and random effects models. Also, the chapter test the so-called Martínez-Miera and Repullo (2010) theory by examining the nexus between competition and bank risk-taking behaviour using the quadratic form of bank Lerner index,

controlling for the effect of institutional quality on these relationships across the five regional economic communities of Africa.

In Chapter Five, the study tests the quiet-life hypothesis as well as the efficient structure hypothesis using Granger-type causality tests. The chapter employs the stochastic frontier analysis technique to estimate both competition and efficiency scores for the 2007 to 2014 period. Additionally, the chapter examines the evolution and convergence of bank competition and efficiency in Africa and the five sub-regional markets to evaluate the levelling effect of financial integration on bank competition and efficiency after decades of financial sector reforms in these markets. In Chapter Six, the thesis tests the hypothesis that deeper financial integration and changes in bank lending behaviour promotes economic growth in emerging markets and vice versa using panel Vector Autoregressive analysis (PVAR). The chapter further examines banking convergence and economic convergence for the harmonizing benefits of deeper financial integration in Africa and the five sub-regions. Chapter Seven concludes the study by summarizing the core findings of the thesis and presenting relevant policy recommendations. Additionally, this last chapter presents readers with the key contributions and limitations of the thesis and proposes future research agenda based on some of the limitations identified.

Figure 1.1: The conceptual framework



Source: Author's construct

References

Affinito, M. (2011). Convergence clubs, the Euro-area rank and the relationship between banking and real convergence. *Bank of Italy Temi di discussione (Working Paper)* No. 809.

African Development Bank. (2010). Financial sector integration in three regions of Africa: How regional financial integration can support growth, development and poverty reduction. Technical Report. Cote D'Ivoire, 1-142.

Ahmed, A. and Suardi, S. (2009). Macroeconomic Volatility, Trade and Financial Liberalization in Africa, *World Development*, 37(10), 1623-1636.

Andersen, T., and Tarp, F. (2003). Financial Liberalization, Financial Development and Economic growth in LDCs. *Journal of International Development,* 15, 189-209.

Andries, A.M. and Capraru, B. (2013). Impact of financial liberalization on banking sectors performance from central and eastern European countries, *PLoS One,* 8(3), 1-9.

Athanasoglou, P.P., Brissimis, S.N. and Delis, M.D. (2008). Bank-specific industry specific and macroeconomics determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money,* 18(2), 121-136.

Baele, L., Ferrando, A., Hördahl, P., Krylova, E. and Monnet, C. (2004). Measuring financial integration in the Euro Area. *European Central Bank Occasional Paper Series No. 14*

Bagehot, W. (1873). Lombard Street: A description of the money market. (1st edition). *Scribner, Armstong and Co*., New York.

Beck, T., Fuch, M. and Singer, D. and Witte, M. (2014). Making cross-border banking work for Africa. The World Bank *Technical Report No. 89202.* Published by: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Eschborn, Germany

Berg, A. and Krueger, A. (2003). Trade, Growth and Poverty: A selective survey. *IMF Working Paper* No. WP/03/30. International Monetary Fund, Washington (February 2003).

Berger, A. N. (1995). The profit-structure relationship in banking-tests of market-power and efficient-structure hypotheses. *Journal of Money, Credit and Banking*, 27(2), 404-431.

Bernanke B.S. and Lown, C.S. (1991). The Credit Crunch. *Brookings Papers on Economic Activity,* (2), 205-47.

Boyd, J.H. and De Nicolò, G. (2005). The theory of bank risk-taking and competition revisited. *Journal of Finance*, 60, 1329–1343.

Broecker, T. (1990). Credit-Worthiness Tests and Interbank Competition. *Econometrica*, 58(2), 429-452.

Buch, C.M. and Heinrich, R.P. (2003). Financial integration in Europe and banking sector performance, in Cecchini, P., Heinemann, F. and Jopp, M. (eds.) (2003). *The Incomplete European Market for Financial Services*, and Vol. 19 of *the series ZEW Economic Studies,* 31-64.

Buch, C.M., Koch, C. and Koetter, M. (2013). Do banks benefit from internationalization? Revisiting the market power-risk nexus, *Review of Finance* (2013), 17(4), 1401–1435.

Chen, S.H. and Liao, C.-C. (2011). Are foreign banks more profitable than domestic banks? Home- and host-country effects of banking market structure, governance, and supervision. *Journal of Banking and Finance*, 35(4), 819-839.

Claessens, S. and van Horen, N. (2014). Foreign Banks: Trends and Impact. *Journal of Money Credit Banks*, 46(1), 295-326.

Demsetz, H. (1973). Industry structure, market rivalry and public policy, *Journal of Law and Economics*, 16, 1–9.

Diallo, B. (2016). Foreign bank entry and bank competition in Africa: An inverted U-shaped relation. *Journal of Developing Areas*, 50(4), 289-308.

Francis, M. E. (2013). Determinants of commercial bank profitability in Sub-Saharan Africa. *International Journal of Economics and Finance,* 5(9), 134-147.

Gertler, M. and Gilchrist, S. (1993). The role of credit market imperfections in monetary transmission mechanism: arguments and evidence. *Scandinavian Journal of Economics*, 95, 43-64.

Ghosh, A. (2016). Banking Sector Globalization and Bank Performance: A comparative analysis of low income countries with emerging markets and advanced economies. *Review of Development Finance*, 6, 58-70.

Hewartz, H. and Walle, Y.M. (2014). Openness and finance growth nexus. *Journal of banking and Finance*, 48, 235-247.

Jiménez, G., Lopez, J. A. and Saurina, J. (2013). How does competition affect bank risk-taking? *Journal of Financial Stability*, 9(2), 185–195.

Kar, M., Nazlioglu, S. and Agir, H. (2011). Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis. *Economic Modeling*, 28(1-2), 685–693

Keeley, M.C. (1990). Deposit insurance, risk, and market power in banking. *American Economic Review,* 80, 1183–1200.

King R. G. and Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108, 717-737.

Klein, P. and Weill, L. (2018). Bank profitability and economic growth. *Bank of Finland Institute for Economies in Transition (BOFIT) Discussion Paper* No. 15/2018. Helsinki (2/7/2018), 1-42.

Leon, F. (2015). Does Bank Competition Alleviate Credit Constraints in Developing Countries? *Journal of Banking and Finance*, 57, 130-142.

Leon, F. (2016). Does the expansion of regional cross-border banks affect competition in Africa? Indirect Evidence. *Research in International Business and Finance*, 37, 66-77

Levy-Yeyati, E. and Micco, A. (2007). Concentration and foreign penetration in Latin American banking sectors: Impact on competition and risk. *Journal of Banking and Finance*, 31, 1633-1647

Love, I. and Pería, M.S.M. (2015). How bank competition affects firms' access to finance, *World Bank Economic Review,* 29, 413–448.

Luo, D., Dong, Y., Armitage, S. and Huo, W. (2017). The impact of foreign bank penetration on domestic banking sector: evidence from China. *The European Journal of Finance*, 23(7-9), 752-780.

Marcus, A.J. (1984). Deregulation and bank policy. *Journal of Banking and Finance,* 8, 557-565.

Martinez-Miera, D. and Repullo, R. (2010). Does competition reduce the risk of bank failure? *Review of Financial Studies, 23*(10): 3638–3664.

Masood, O. and Ashraf, M. (2012). Bank-specific and macroeconomic profitability determinants of Islamic banks: The case of different countries. *Qualitative Research in Financial Markets,* 4(2/3), 255-268.

McKinnon, R. (1973). Money and Capital in Economic Development. The *Brookings Institution*, Washington DC.

Motelle, S. and Biekpe, N. (2015). Financial integration and stability in the Southern African development community. *Journal of Economics and Business,* 79, 100–117.

Panopoulou, E. (2009). Financial variables and Euro area growth: A non-parametric causality analysis. *Economic Modelling*, 26(6), 1414–1419.

Pradhan, R.P., Arvin, M.B., Hall, H.H. and Bahmani, S. (2014). Causal Nexus between economic growth, banking sector development, stock market development, and other macroeconomic variables: The case of ASEAN countries. *Review of Financial Economics*, 23, 155-173.

Qin, X., and Dickson, P. (2012). Commercial banks profitability position: The case of Tanzania. *International Journal of Business and Management,* 7(13), 136-144.

Robinson, J. (1952). The generalization of the general theory; in Robinson, "The rate of interest and other essays". 2nd Edition, *Macmillan*, London.

Samolyk, K. (1991). A Regional Perspective on Credit View. *Federal Reserve Bank of Cleveland Economic Review, 27*, 27-38

Sarpong-Kumankoma, E., Abor, J., Aboagye, A. Q. Q. and Amidu, M. (2017). Freedom, competition and bank efficiency in Sub-Saharan Africa. *International Journal of Law and Management*, 59(6), 1359-1380.

Schumpeter, J.A. (1911). The Theory of Economic Development; an Inquiry into Profits, Capital, Credit, Interest, and the Business Cycle. *Translated by Opie, R. Harvard University Press*, Cambridge.

Shaw, E.S. (1973). Financial Deepening in Economic Development. *Oxford University Press*, New York.

Stiglitz, J.E. (1993), The role of the state in financial markets, T*he World Bank Economic Review, 7(Suppl-1), 19-52.*

Weill, L. (2013). Bank competition in the EU: How has it evolved? *Journal of International Financial Markets, Institutions and Money*, 26(C), 100-112.

World Bank (2007). Financial sector integration in two regions of Sub-Saharan Africa. World Bank, January 2007, Washington DC.

World Bank (2018). Global Financial Development Report 2017/2018. World Bank, Washington DC.

Appendix

Appendix 1.A: Country composition of study sample by Regional Economic Community

REC	Country	No. of Banks	Country	No. of Banks
AMU	Algeria	14	Morocco	11
	Libya	8	Tunisia	15
	Mauritania	6		
EAC	Burundi	3	South Sudan	3
	Kenya	27	Tanzania	26
	Rwanda	8	Uganda	16
ECCAS	Angola	15	Chad	3
	Cameroon	5	DRC	11
	Central African Republic	2	Gabon	5
ECOWAS	Benin	5	Liberia	3
	Burkina	8	Mali	6
	Cape Verde	6	Niger	3
	Cote D'Ivoire	6	Nigeria	21
	Gambia	4	Senegal	9
	Ghana	19	Sierra Leone	7
	Guinea	3	Togo	3
SADC	Botswana	7	Namibia	4
	Lesotho	3	Seychelles	4
	Madagascar	4	South Africa	12
	Malawi	5	Swaziland	4
	Mauritius	11	Zambia	14
	Mozambique	7	Zimbabwe	9
Others	Djibouti	4	Ethiopia	9
	Egypt	21	Sudan	6
Totals	**Countries**	**47**	**Banks**	**405**

Source: Author's collation of data from Bankscope database (2016)

CHAPTER TWO
OVERVIEW OF THE FINANCIAL SYSTEMS OF FIVE REGIONAL ECONOMIC COMMUNITIES OF AFRICA

2.1 Introduction

This chapter provides a synopsis of relevant aspects of the financial sector of Africa, with emphasis on the AMU, EAC, ECCAS, ECOWAS and SADC sub-regions. The analysis covers seven thematic areas, namely: financial integration and banking sector development, market structure and competition, efficiency, profitability, bank stability and economic growth. The indicators of financial integration include both *de jure* and *de facto* measures of integration to account for both policy reforms and actual flows of capital and institutions across countries. The indicators of banking sector development and financial inclusion capture the domestic credit to the banking sector by banks and bank branches per thousand adults. The level of bank competition and efficiency measures market structure changes and competitive conduct of banks in periods of financial reforms. Additionally, the profitability and stability of the banking sector reflect the effects of financial integration and bank behavior on bank performance in an economy while the economic growth analysis reflects the effect of banking sector performance and other factors on real sector growth in an economy.

2.2 Financial integration and banking sector development in Africa

Over the past three decades, many African countries have adopted major financial sector reforms to unfetter the mobility and growth of capital and banking institutions across national borders. Financial integration has been at the heart of Africa's regional integration drive and the quest to overcome the region's political and socio-economic challenges, enhance global competitiveness of member countries and improve the livelihoods of their citizens (Ndomo, 2009; Muthoga et al., 2013). The small scale of national financial markets and institutions constrains financial sector development and reduces financial inclusion, resulting in high intermediation cost and low output growth. In recognition of these constraints, the African Union took steps to establish an African Economic Community (AEC)[8] in 1980 (Ndomo, 2009). This

[8] This was later modified into the so-called Abuja Treaty of 1991. However, it was not until 1994 that a resolution was passed by the OAU Council of Ministers to commence its implementation. In effect, the treaty partitioned AEC

decision led to the establishment of a mosaic of regional economic communities, largely based on proximity and geographic region. However, the agreements and treaties that configure these regional economic communities allow for overlapping memberships due to political dichotomized and other strategic socio-economic factors, which hinders the overall integration agenda of the AEC. Besides, progress has been slow, with mixed results across the regional economic communities.

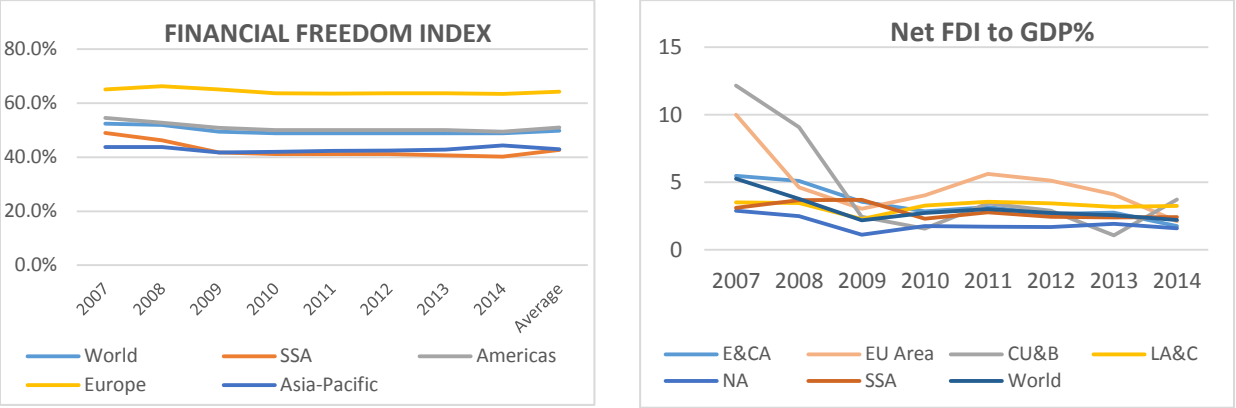
However, after years of effort, certain major setbacks have hindered progress towards achieving the stated aims of the AEC by the deadline of 2027. The success of financial integration largely depends on the scope and speed of reforms, the compliance of participating countries, as well as its effects on the conduct and performance of financial intermediaries (Frey and Volz, 2011). The literature on financial integration in Africa suggests that some successes have been achieved at the sub-regional level, with the formation of monetary unions, tariff agreements among others. Despite these improvements, the speed and scope of Africa's financial integration still lags behind that of other regions of the world (African Development Bank, 2010; Cihák et al., 2012; Beck and Maimbo, 2013; Beck and Cull, 2014; Moyo et al., 2014). Figure 2.1 shows that, for the period 2007 to 2014, while global financial freedom index averaged around 49.75%, that of Africa was 42.65%, compared to 42.93% for Asia-Pacific, 50.95% for the Americas and 64.30% for Europe. Also, net inflows of foreign direct investment averaged around 3.053% of GDP globally. However, Sub-Saharan Africa recorded an average of 2.84% while other regions like Central Europe and the Baltics recorded a net FDI inflow of 4.54% of GDP, the Euro Area recorded 4.82 % of GDP among others.

There were also major variations across and within Africa's sub-regional markets. Appendix 2A shows that SADC member countries had the most liberalized financial markets in Africa, recording an average financial freedom index of 50.80 over the period 2007-2014. This was followed by the EAC financial system (49.97) and ECOWAS (46.12). However, the AMU and ECCAS recorded average financial freedom indices of 34.19 and 36.69 respectively for the same period. Similarly, the ECCAS sub-region recorded the least foreign direct investment inflows (0.67 percent of GDP) for the study period. This was most likely due to the instability in the central African region among other factors. This was followed by the EAC sub-region (2.72 percent of GDP), Also, for the 2007-2014 period, the AMU recorded an average FDI net inflow of 3.12 percent of GDP per annum whiles ECOWAS and SADC respectively recorded averages of 4.17 percent and 5.70 percent respectively. Appendix 2A also shows that the AMU had the least regional cross-border

into five sub-regional communities: North, West, South, East and Central Africa with the view of establishing the AEC over a 34-year period spanning 1994 to 2027 (Ndomo, 2009).

banking as well as the least foreign bank activities in Africa. For the 2007 - 2014 periods, the AMU had foreign bank assets making up only 11.88 percent of total bank assets whiles regional bank assets made up only 2.37 percent of total bank assets. This was much better in other regions. For instance, in the EAC, foreign bank assets accounted for 53.32 percent of total bank assets whiles regional bank assets accounted for 32.41 percent. In the ECCASS sub-region, foreign and regional bank assets accounted for 54.76 percent and 27.09 percent of total bank assets respectively whiles accounted for 63.68 and 35.75 percent in the SADC financial system respectively. The ECOWAS sub-region was found to maintain the highest numbers of both regional (43 percent) and foreign bank assets (65 percent) in Africa over 2007-2014.

Figure 2.1: Financial integration in Africa and the rest of the world



Sources: Data for the financial freedom index is sourced and summarized from the Economic Freedom Database of the Heritage Foundation (2016) while data for the Net inflows of foreign direct investment (FDI) is sourced from the Global Financial Development Database of the World Bank Group (2016).

Appendices 2B (I– IV) present evidence of the intra-REC variations of the financial integration measures used in the study. The evidence in Appendices 2 B (i) suggest that the high financial freedom recoded in the SADC bloc was largely led by Mauritius and South Africa with annual average financial freedom indices of 67.5 and 60 over 2007 - 2014 respectively whiles the least financially free economy is identified as Zimbabwe (11.43), followed by Seychelles (30). In the EAC, financial freedom was led by Uganda (58.75), Kenya (50) and Tanzania (50) whiles Burundi lagged behind with an average financial freedom index of 30 per annum over the study period. Data for South Sudan was however not available on the WDI database. The study also found that though ECOWAS did not record the highest average financial integration in Africa, countries within the region seem to be doing quite well in terms of financial freedom. This was led by

Ghana (57.5), Cape Verde (57.5), Cote D'Ivoire (55) and Benin (53.75) while Liberia (20) and Sierra Leone (25.71) lagged behind. In ECCAS, the process of financial freedom was led by Cameroon (50) and Chad (42) while the Democratic Republic of Congo (20) and Central African Republic (32.86) lag behind. Similarly, the pursuit of financial freedom in the AMU is slower than the rest of Africa. However, Morocco (60) and Mauritania (42.86) seem to lead the way while Libya (20) and Algeria (28.75) are the least financially free economies in the sub-region for the period under study.

In terms of FDI inflows, Appendix 2 B (ii) shows that whiles Mozambique and Seychelles attracted the highest average net FDI inflows of 21.11 and 20.50 percent of GDP per annum for the study period in the sub-region, countries like South Africa (1.91 percent of GDP) and Swaziland (1.95 percent of GDP) attracted the least net FDI inflows per annum for the 2007-2014 period. In ECOWAS, FDI inflows were greatest in Liberia (34.18 percent of GDP per annum), Sierra Leone (11.33 percent) and Niger (10.17 percent) while the least FDI net inflows were received by Cote D'Ivoire (1.52 percent and Burkina Faso (1.63 percent). Evidence from the EAC shows that Uganda attracted an average of 4.62 percent of its GDP in FDI inflows whiles Tanzania receives 4.04 percent over the period 2007- 2014. However, South Sudan had an average annual loss of FDI inflows (-2.21) over the study period while Burundi recorded an average of 0.32 percent of its annual GDP as FDI net inflows for the period 2007-2014. Also, Appendix 2 B(ii) shows that in the AMU, Mauritania received the highest average annual inflows of net FDI inflows at 10.49 percent of GDP while Algeria received the least (1.22 percent of GDP). Lastly, FDI net inflows in the ECCAS sub-region is uneven, with Gabon receiving an average of 4.66 percent of its annual GDP as FDI net inflows over 2007-2014 while Angola had the lowest FDI net inflows of -2.15 percent of annual GDP for the same period.

Appendix 2 B(iii) shows that within SADC, whiles the banking sectors of Namibia, Swaziland and Lesotho are largely dominated by Pan-African bank assets, South Africa (0.12% of total bank assets), Mozambique (5.10%) and Seychelles (5.25%) are largely dominated by domestic banks. In ECOWAS, Liberia (70.70%), Benin (70.18%), Niger (63.08%) and Burkina Faso (61.90%) lead the regional banking integration drive while Cape Verde (0.28%) and Togo (16.51%) lag behind the rest. In the ECCAS banking sector, while Chad and Central African Republic (CAR) respectively had average regional bank assets of 52.37 per cent of total bank assets, Cameroon (5.62%) and Angola (15.87%) had the lowest regional bank assets in that sub-region. The EAC had similar disparities among member countries, with South Sudan recording over 90 per cent of its bank assets belonging to Pan-African banking institutions whiles Kenya and Burundi had less

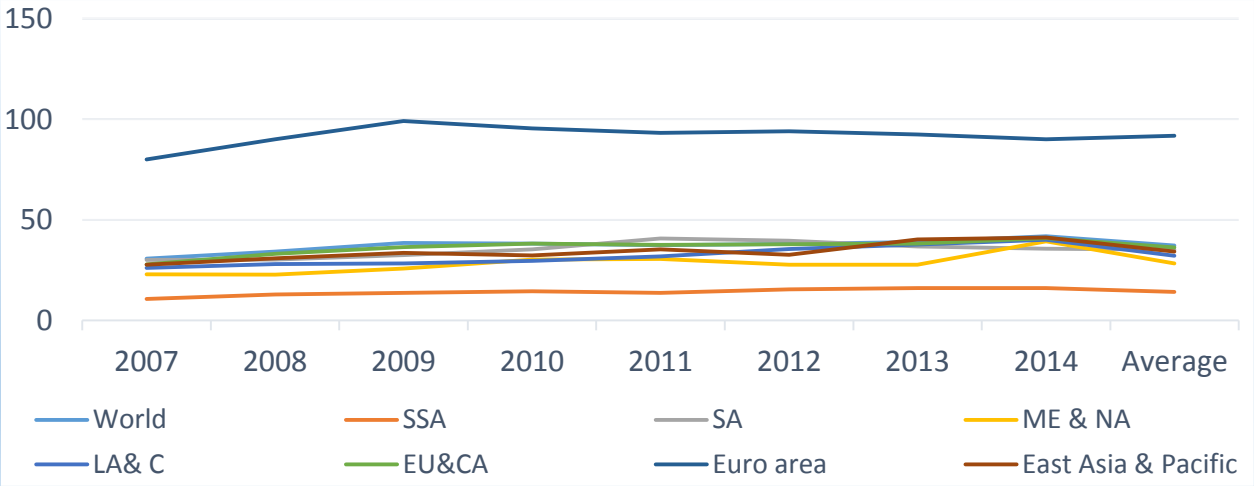
than 10 per cent of their banking assets in Pan-African banks. The situation is even worse in the AMU where all countries maintain less than 5 per cent of their assets in Pan-African banks. In the AMU, the highest regional bank assets was recorded in Tunisia (8.67%) over 2007-2014. Appendix 2.B (iv) shows similar disparities for the various countries' foreign bank assets ratios in each REC.

The relatively low level of financial integration in Africa and its limited scope has adverse consequences for the development of Africa's financial markets, the competitive conduct of financial intermediaries and their profitability (Gamariel, 2015; Sissy et al., 2017). Figure 2.2 show that Africa has the most underdeveloped financial markets in the world. While the global average for private credit by deposit money banks stood at 37.2% of GDP for the study period, Africa had an average of 14.06%. Also, at the sub-regional level, the evidence on Appendix 2C(i) suggest that the AMU sub-region recorded an average private credit by banks to GPD of 40.19% over the 2007-2014 period, followed by SADC (37.59%) and ECOWAS (19.07%), while regions like the EAC and ECCAS recorded average private credit to GDP percentages of 17.55 and 10.22 respectively. However, the evidence in Appendix 2C(ii) shows that Morocco and Tunisia are leading the AMU member states in terms of financial sector development, recording average private credit to the domestic sectors of 67.68 and 62.68 percent of their GDPs over 2007-2014. Libya recorded the least private credit to the domestic sector by banks (10.51 percent of GDP), followed by Algeria (13.99%). In the EAC, average private credit to the domestic sector by banks is generally low, with the highest average in Kenya (30.05%). Most other countries in the EAC recorded private credit rates of less than 20 percent of their annual GDP values, with the lowest being South Sudan at 0.98 percent of annual GDP. The ECCAS sub-region has a much lower financial sector development rate as the 2007-2014 average of no single country reached 20 percent of GDP. However, the least private credit to the domestic sector by banks was recorded in the Democratic Republic of Congo. In ECOWAS, Cape Verde has the most developed financial sector whiles Sierra Leone has the least developed financial sector. Also, average financial sector values in ECOWAS across the various countries are low and needs improvement as well. The study finds that in the SADC region, the least financially developed market is Malawi, with average private credit to the domestic sector by banks of 10.42 percent of annual GDP over 2007-2014. However, Mauritius (86.89%) and South Africa (70.83%) led the rest of the SADC members in terms of private credit to the domestic sector by banks.

These findings clearly suggest that whiles there are major challenges with forging inter-REC collaborations towards a broad harmonization across Africa's financial markets, significant disparities exist within each sub-regional bloc, where shared policies and programmes have still failed to promote convergence of key

financial market indicators. This reduces the commonalities that are needed to motivate national leaders to agree on terms and conditions for deeper integration across Africa.

Figure 2.2: Private credit to domestic sector by banks (as a percentage of GDP): Africa and the World



Source: Author's computation from the World Bank's Global Financial Development Database (2016)

2.3 Market structure and competition in five RECs of Africa

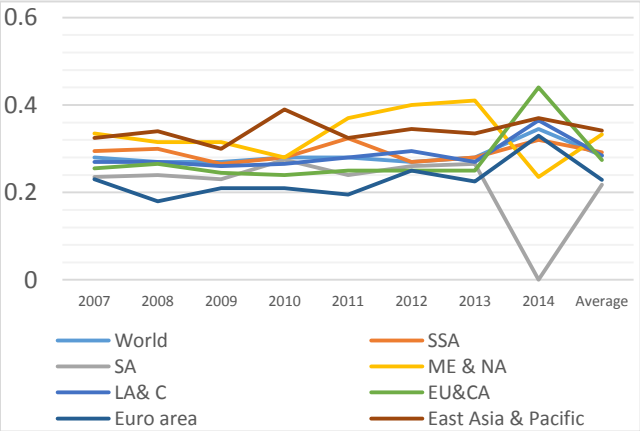
Prior to the introduction of financial sector reforms, African financial markets were largely government controlled and entry restricted to a few large firms. The banking sector, which was largely inherited from the erstwhile colonial administration, was dominated by foreign banks and some state-owned banking firms (Stiglitz, 1993). However, after years of reforms, there have been some improvements. However, several studies still find African bank markets highly concentrated, uncompetitive and very volatile compared to most other regions of the world (Beck et al., 2011; Amidu and Wolfe, 2013; Beck and Cull, 2014; Moyo et al, 2014; Marchettini, Mecagni and Maino, 2015; Leon, 2016).

Figure 2.3(A) shows that apart from two geographic regions (East Asia and the Pacific: Middle East and North Africa), Africa has one of the most uncompetitive banking sectors in the world with an average Lerner index of 0.29 as opposed to the world average of 0.28 and better in other regions over the 2007-2014 period. Similarly, Figure 2.3(B) shows that bank competition in Africa is greatest in the East African community, followed by the ECOWAS and SADC banking sectors, with the ECCAS and AMU banking markets lagging the rest of the continent. Competition is mostly considered a positive stimulant in any

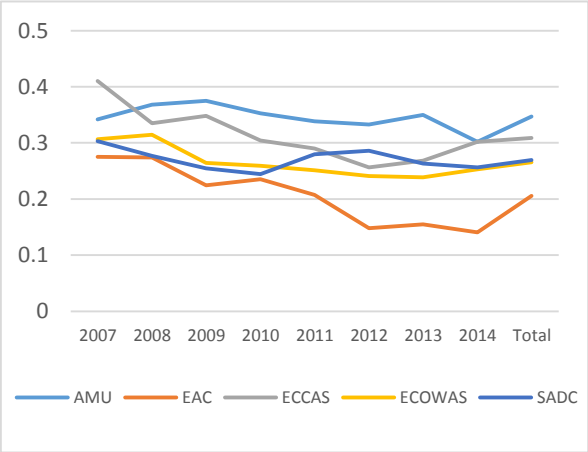
sector. According to Casu and Girardone (2009), competition fosters innovation and efficiency in the banking industry and helps improve the quality of services provided by firms in their bid to stay profitable. Besides, Beck and Cull (2014) affirm that lack of competitiveness and other factors which promote inefficiencies in banking markets also have a negative effect on bank profitability (Ghosh, 2016). Also, Pagano (1993) opines that low levels of competition in banking markets is a recipe for inefficiency and poor service delivery, which has the end effect of adversely affecting the rate of economic growth.

Figure 2.3: Bank Lerner index

A: Africa and the rest of the world



B: Five RECs of Africa

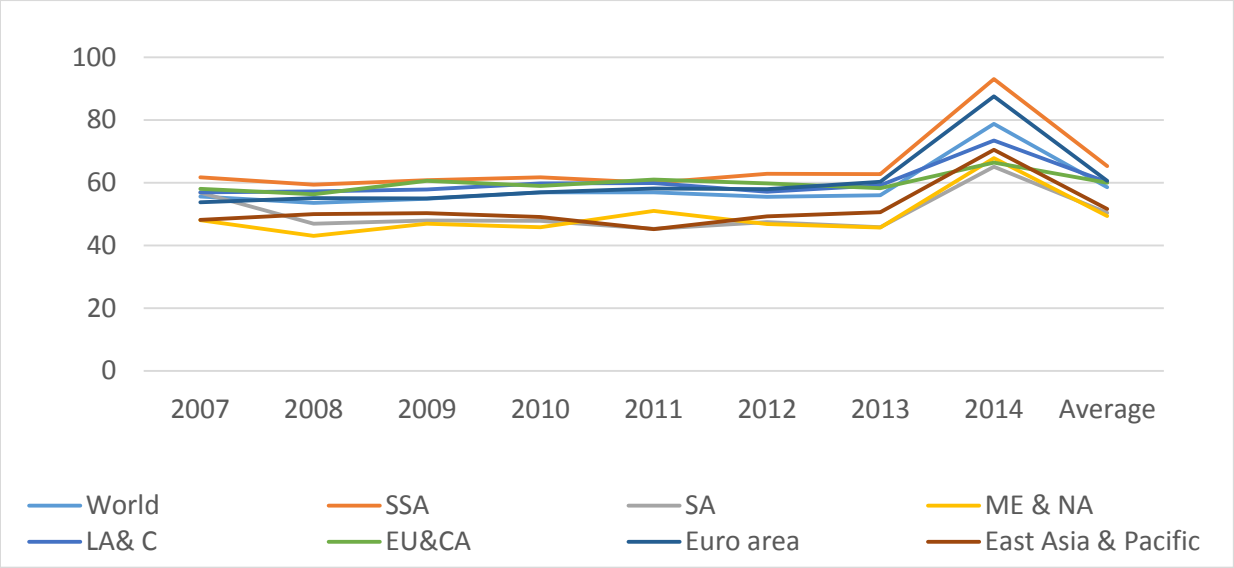


Source: Authors' calculations from World Bank's Global Financial Development (A) and Bankscope Databases (B) (2016).

2.4 Bank efficiency in five regions of Africa

Cost efficiency indicates a firm's ability to provide goods and services to its clients at optimal cost. According to Fu and Heffernan (2009) a cost-effective bank is better able to provide cheaper and more differentiated products to clients to stay profitable. Achieving efficiency in financial markets is therefore a desirable goal of regulatory authorities as this enhances the turnover of capital and ensures greater productivity in an economy. The evidence from Figure 2.4 shows that African banking markets are the most cost-inefficient in the world, recording the highest cost-to-income ratios across all years from 2007-2014. Similar tends are recorded in the sub-regional markets in Africa (Appendix 2C).

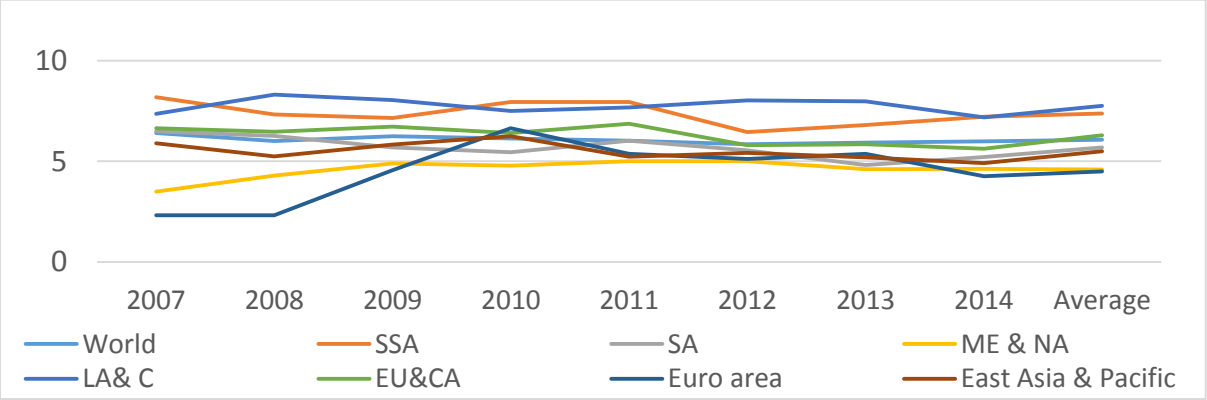
Figure 2.4: Bank cost-to-income ratio



Source: Author's computation from the World Bank's Global Financial Development Database (2016)

Also, Figure 2.5 shows that banks in Africa shift the excessive cost of their operations to customers in the form of high lending-deposit spreads. This further point to the lack of competitiveness of the banking industry in Africa and the possible negative effects it has on investment borrowing and economic activities (Amidu, 2015).

Figure 2.5: Bank lending-deposit spreads

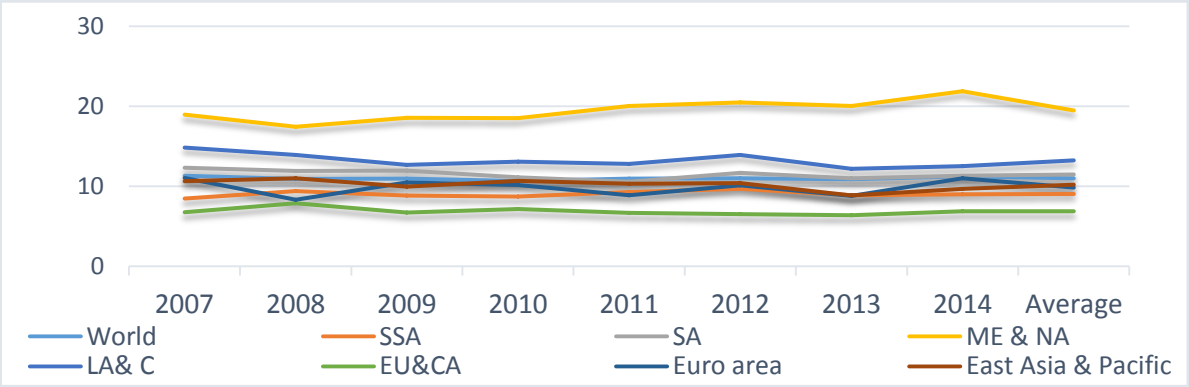


Source: Author's computation from the World Bank's Global Financial Development Database (2016).

2.5 Financial stability

A stable financial system is considered a very important ingredient for promoting efficient resource distribution for higher economic growth. However, achieving an optimal resolution of the trilemma of promoting economic growth through enhanced bank efficiency via greater competitiveness and bank stability evades even the most advanced economies. Figure 2.6 shows that Sub-Saharan Africa is among the most volatile financial sectors in the world. Over the period 2007-2014, Africa largely maintained the second most volatile banking sector globally, only performing better than the European Union and Central Asia.

Figure 2.6: Bank z-scores



Source: Author's computation from the World Bank's Global Financial Development Database (2016).

Also, Table 2.1 shows that average bank insolvency risk is also generally high, with z-scores averaging around 21.23 for the sampled banks over 2007-2014, while bank nonperforming loans ratio averaged around 5.32 percent of total loans for the same period. There are also major variations among Africa's sub-regional markets, with the AMU banking market recording the highest distance to default of 31.83 percent, followed by the SADC and EAC banking sectors with z-scores of 21.10 and 19.11 percent respectively. The ECOWAS and ECCAS regions lag the rest, recording average z-scores of 17.95 and 15.86 percent respectively.

Table 2.1: Characteristics of Africa's financial and banking sector

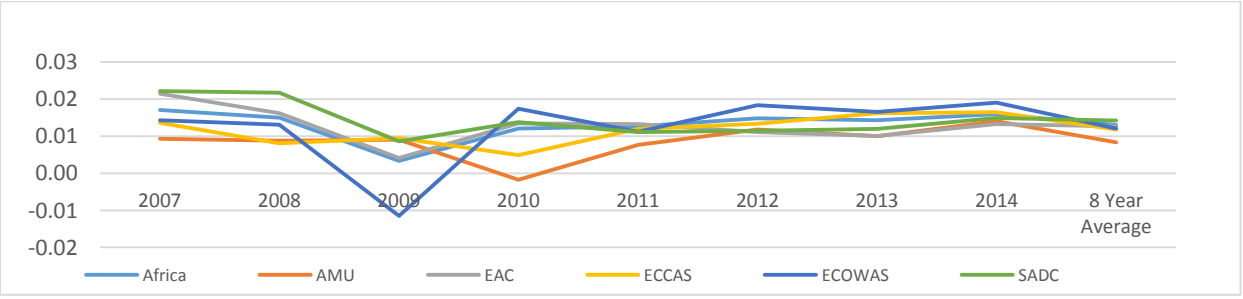
Region	Banks' weighted average Z-Score	NPL ratio
AMU	31.83096	0.0372947
EAC	19.10615	0.0555854
ECCAS	15.86275	0.0307917
ECOWAS	17.94684	0.0802956
SADC	21.09895	0.0406409
Full Sample	21.22535	0.0532043

Source: Author's computation from the World Bank's Global Financial Development Database (2016).

2.5.1 Bank profitability

Bank profitability has been identified by the theoretical and empirical literature to provide the necessary cushion for economic shocks and provide the needed capital to revamp an ailing economy in times of crisis (Athanasoglou et al., 2008). Greater bank profitability breeds innovation and efficiency, which both enhance economic growth (Chen and Liao, 2011). However, adverse factors such as the recent financial crisis may adversely affect bank profitability and their ability to cushion the economy against major shocks. Figure 2.7 shows that the banking sector in Africa took a general hit during the 2008 global financial crisis. From moderate performance in 2007, all banking markets in Africa realized major reductions in their return on asset in the 2008-2009 period, with the effect lasting up to the 2010 fiscal year for the AMU and ECCAS banking sectors. Figure 2.7 shows that the ECOWAS region recorded the lowest bank return on assets in the 2009 fiscal year, but subsequently rose up to outperform the other banking markets in subsequent years. The EAC and SADC regions recovered after the 2009 period to normalize their bank profitability following the crisis.

Figure 2.7: Bank return on assets

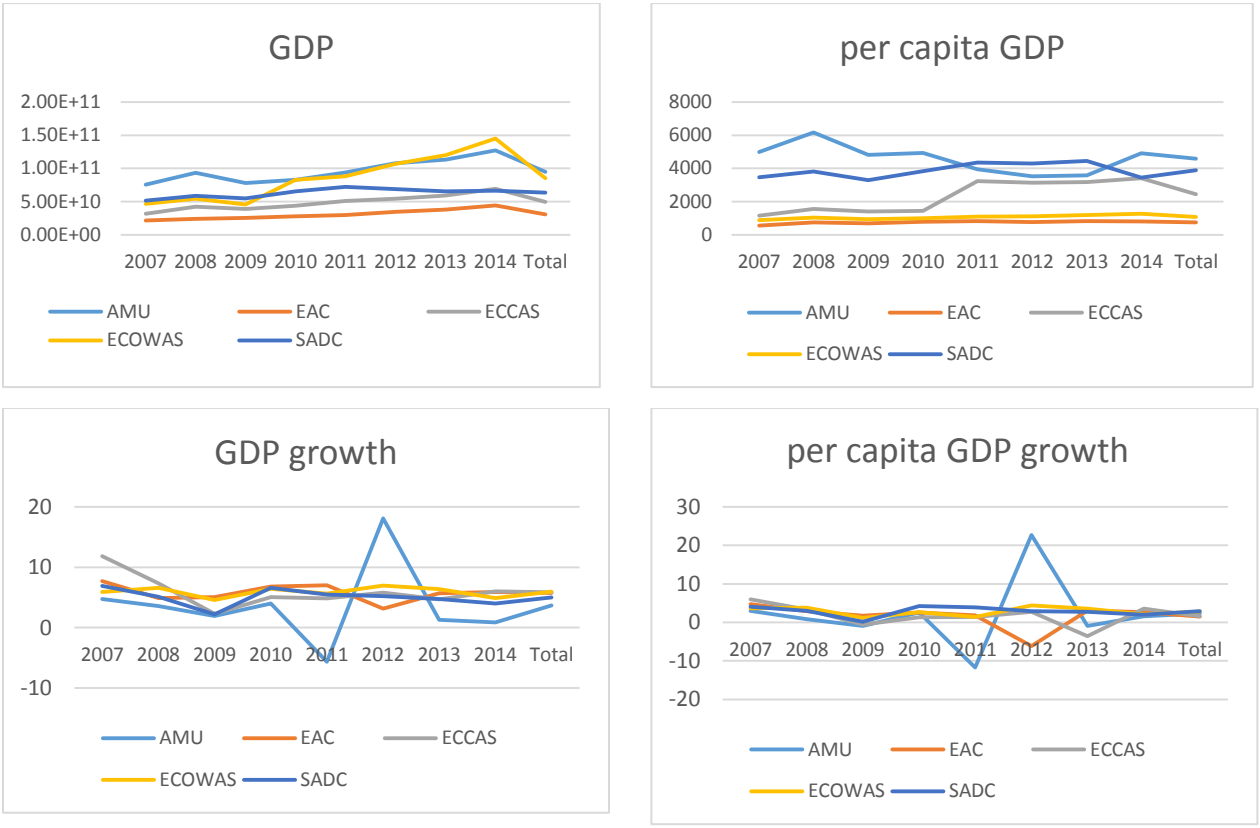


Source: Author's computation from the Bankscope Database (2016).

2.6 Economic growth in Africa: A sub-regional analysis

Economic growth reflects the ability of a country to effectively and efficiently mobilize and optimize the benefits of both local and foreign factors of production. Economic growth is a desirable state for all countries as it promotes better living standards and enhances the value of life. Figures 2.8 shows that African economies have seen moderate but steady rise in their GDP levels over the years, with a significant fall in economic growth over the 2008-2009 period in response to the impulses of the global financial crisis of 2008. However, almost all REC normalized their GDP levels subsequently except the AMU sub-region which saw a continuous fall in per capita GDP levels (GDPPC) over the next couple of years till 2013 after which per capita GDP begun to rise again. Also, the growth rate in GDP and per capita GDP in the AMU saw significant hikes and dips over the period, reducing drastically between 2010 and 2011, with a significant rise over the next year (2011-2012) and then falling back to normal after another period (2012-2013). This could be attributed to the beginning and end of the so-called Arab spring, which saw significant political instability in this region over the period.

Figure 2.8: GDP and per capita GDP in Africa's regional economic communities



Source: Author's calculations from World Bank's World Development Indicators Database (2016).

2.7 Conclusion

This chapter discusses starlit facts about Africa's financial system. The discussions show that despite years of reforms and attempts to foster synergies across countries and sub-regional blocs, Africa's financial systems are still poorly developed, highly uncompetitive and very volatile compared to most other regions of the world (Beck et al., 2011; Amidu and Wolfe, 2013; Beck and Cull, 2014; Moyo et al, 2014; Marchettini, Mecagni and Maino, 2015; Leon, 2016; Oduor, Ngoka and Odongo, 2017). Consequently, bank efficiency and profitability in Africa are generally low and per capita GDP lags that of many regions of the world. From the foregoing discussions the study conjectures that financial market conditions in Africa play a significant role in determining the performance of banks and these affect the growth performance of African economies. This imposes the need for a continuous empirical interrogation of Africa's ongoing financial integration process *vis-à-vis* financial intermediary and general economic performance to guide policy initiatives that ensure the region enjoys positive net benefits from integration. In the ensuing chapters, the study examines the relationship between Africa's financial integration process, bank performance and economic growth and compares the results across five regional economic communities for peer-learning and better understanding of the sub-regional differences in these relationships.

References

African Development Bank. (2010). Financial sector integration in three regions of Africa: How regional financial integration can support growth, development and poverty reduction. Technical Report, Cote D'Ivoire, 1-142.

Amidu. M. (2015). Do Sub-Saharan African banks with market power gain from monetary policy? *African Finance Journal*, 17(2), 1-24.

Amidu, M. and Wolfe, S. (2013). Does bank competition and diversification lead to greater stability? Evidence from emerging markets. *Review of Development Finance*, 3(3), 152–166.

Athanasoglou, P.P., Brissimis, S.N. and Delis, M.D. (2008). Bank-specific industry specific and macroeconomics determinants of bank profitability. *Journal of International Financial Markets, Institutions and Money,* 18(2), 121-136.

Beck, T. and Cull, R. (2014). Banking in Africa, In Berger, A.N., Molyneux, P. and Wilson, J.O.S. (eds.) *Oxford Handbook of Banking,* 2nd edition. Oxford: Oxford University Press.

Beck, T. and Maimbo, S.M. (2013). Financial sector development in Africa: Opportunities and challenges. World Bank, Washington

Beck, T., Maimbo, S. M., Faye, I. and Triki, T. (2011). Financing Africa through the crisis and beyond. Washington DC: World Bank.

Casu, B. and Girardone, C. (2009). Testing the relationship between competition and efficiency in banking: A panel data analysis. *Economic Letters*, 105, 134-137.

Chen, S.H. and Liao, C.C. (2011). Are foreign banks more profitable than domestic banks? Home- and host-country effects of banking market structure, governance, and supervision. *Journal of Banking and Finance*, 35(4), 819-839.

Čihák, M., Demirgüç-Kunt, A., Feyen, E. and Levine, R. (2012). Benchmarking financial systems around the world. *World Bank Policy Research Working Paper* No. 6175. The World Bank, Washington DC, USA.

Frey, L. and Volz, U. (2011). Regional financial integration in Sub-Saharan Africa: An empirical examination of its effects on financial market development. *South African Journal of Economics*, 81(1), 79-117.

Fu, X. and Heffernan, S. (2009). The effects of reform on China's bank structure and performance. *Journal of Banking and Finance*, 33(1), 39-52.

Gamariel, G. (2015). Financial liberalization policies and bank profitability in Sub-Saharan Africa. *International Journal of Research in Business Studies and Management*, 2(10), 1-14.

Ghosh, A. (2016). Banking sector globalization and bank performance: A comparative analysis of low income countries with emerging markets and advanced economies. *Review of Development Finance*, 6, 58-70.

Leon, F. (2016). Does the expansion of regional cross-border banks affect competition in Africa? Indirect Evidence. *Research in International Business and Finance*, 37, 66-77.

Marchettini, D., Mecagni, M. and Maino, R. (2015). Evolving banking trends in Sub-Saharan Africa: Key features and challenges. International Monetary Fund. Washington DC.

Moyo, J., Nandwa, B., Oduor, J. and Simpasa, A. (2014). Financial sector reforms, competition and banking system stability in Sub-Saharan Africa. Paper presented at the joint RES-SPR *Conference on "Macroeconomic challenges facing low-income countries"*. International Monetary Fund, Washington, DC—January 30–31, 2014.

Muthoga, S., Obere, A. Mburu, K. and Mukwate-Muchai, D. (2013). Regional financial integration and economic growth in the East African community. *International Journal of Economics and Management Sciences*, 2(9), 64-76.

Ndomo, A. (2009). Regional Economic Communities in Africa: A progress overview. *Study commissioned by the GTZ*, Nairobi, May 2009. Available at: http://www2.giz.de/wbf/4tDx9kw63gma/RECs_Final_Report.pdf

Oduor, J., Ngoka, K. and Odongo, M. (2017). Capital requirement, bank competition and stability in Africa. *Review of Development Finance*, 7(1), 45-51.

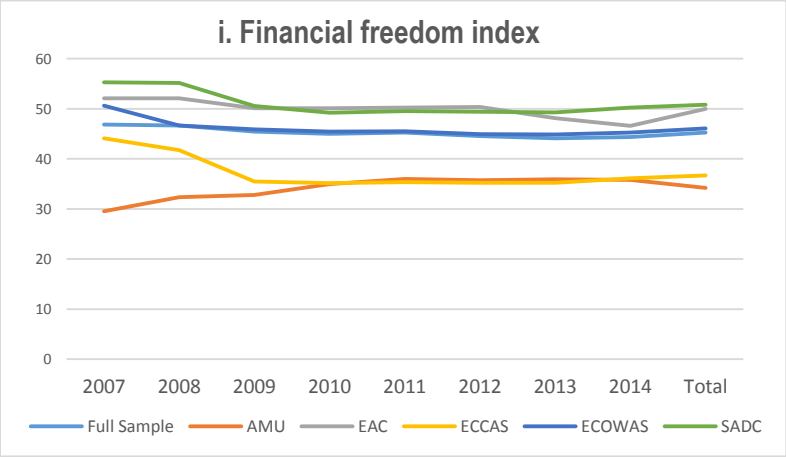
Pagano, M. (1993). Financial markets and growth: An overview. *European Economic Review*, 37(2-3), 613-622.

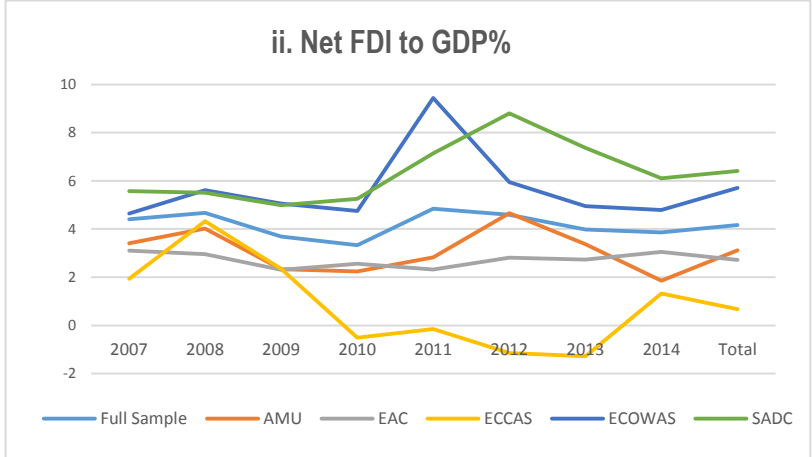
Sissy, A.M., Amidu, M. and Abor, J.Y. (2017). The effects of revenue diversification and cross border banking on risk and return of banks in Africa. *Research in International Business and Finance*, 40, 1–18.

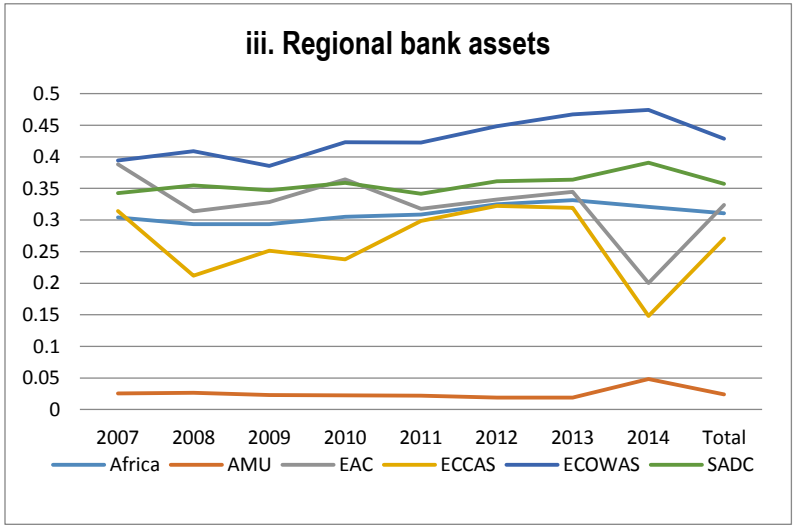
Stiglitz, J.E. (1993). The role of the state in financial markets, *The World Bank Economic Review, 7(Suppl-1), 19-52.*

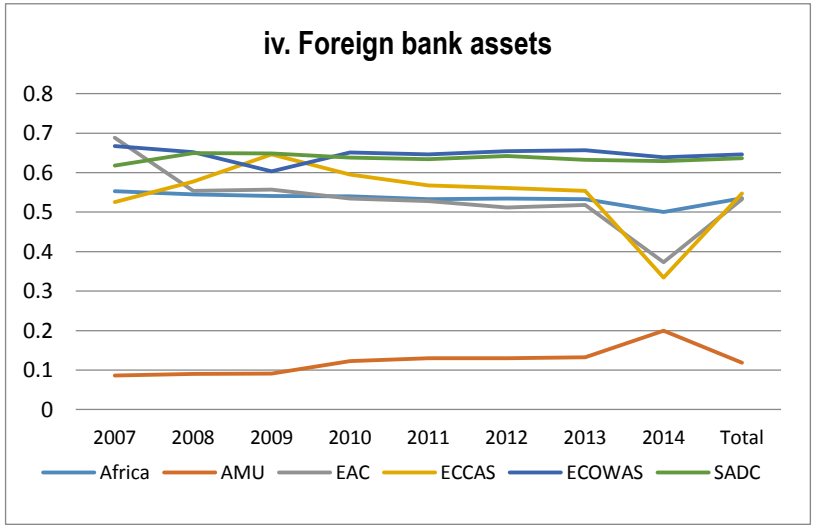
Appendices

Appendix 2.A: Financial integration and banking sector development in Africa: inter-REC summary



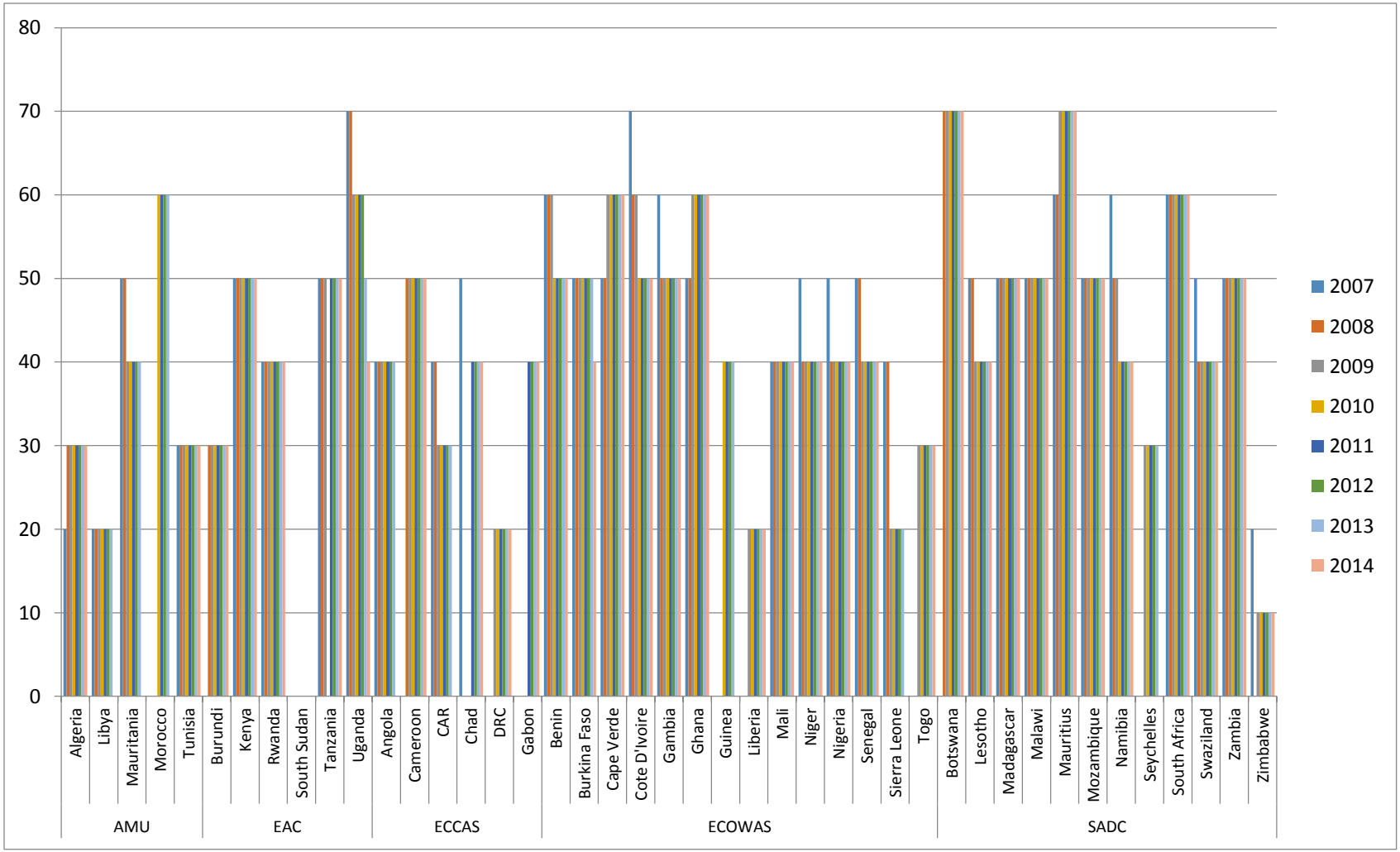






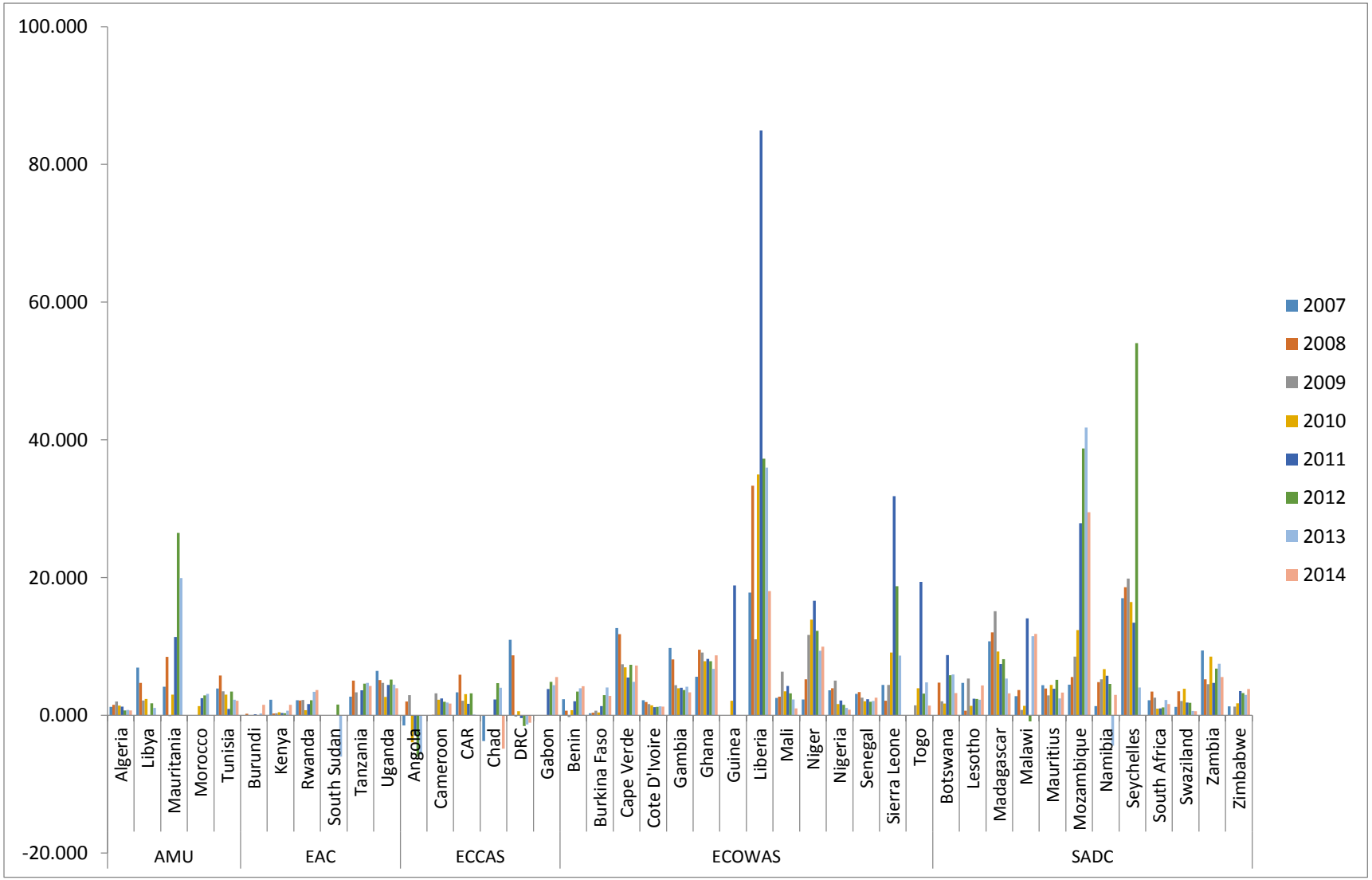
Sources: Authors' calculations from Heritage Foundation's Economic Freedom (i), World Bank's Global Financial Development (ii) and Bankscope (iii and iv) Databases (2016)

Appendix 2 B (i): Financial integration in Africa: intra-REC summary: FINFREE



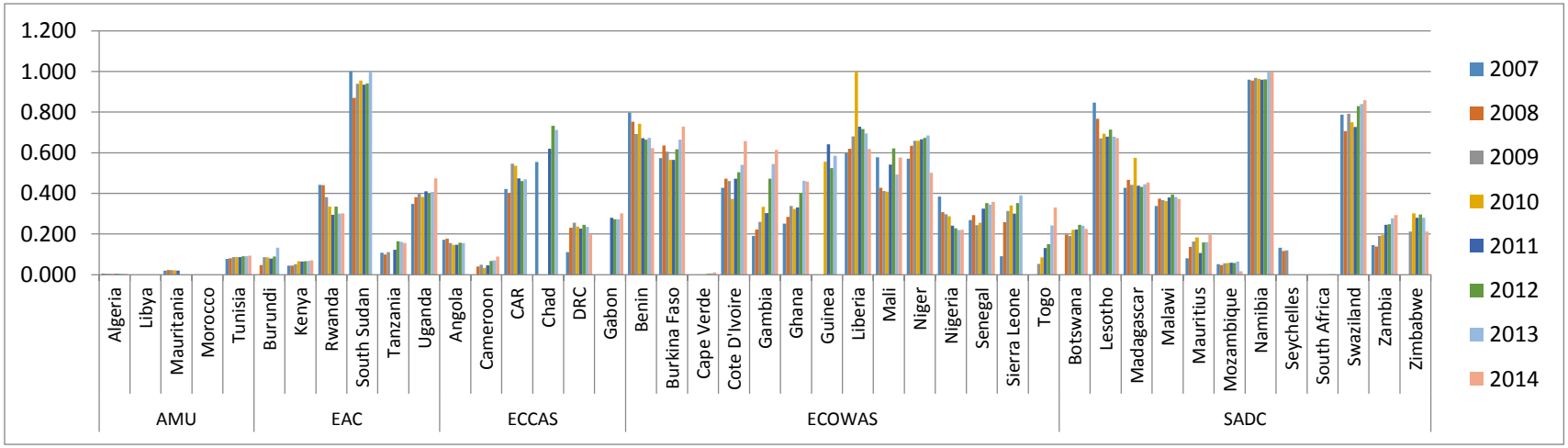
Source: Authors' calculations from Heritage Foundation's Economic Freedom Database (2016)

Appendix 2 B (ii): Financial integration in Africa: intra-REC summary: Net FDI inflows

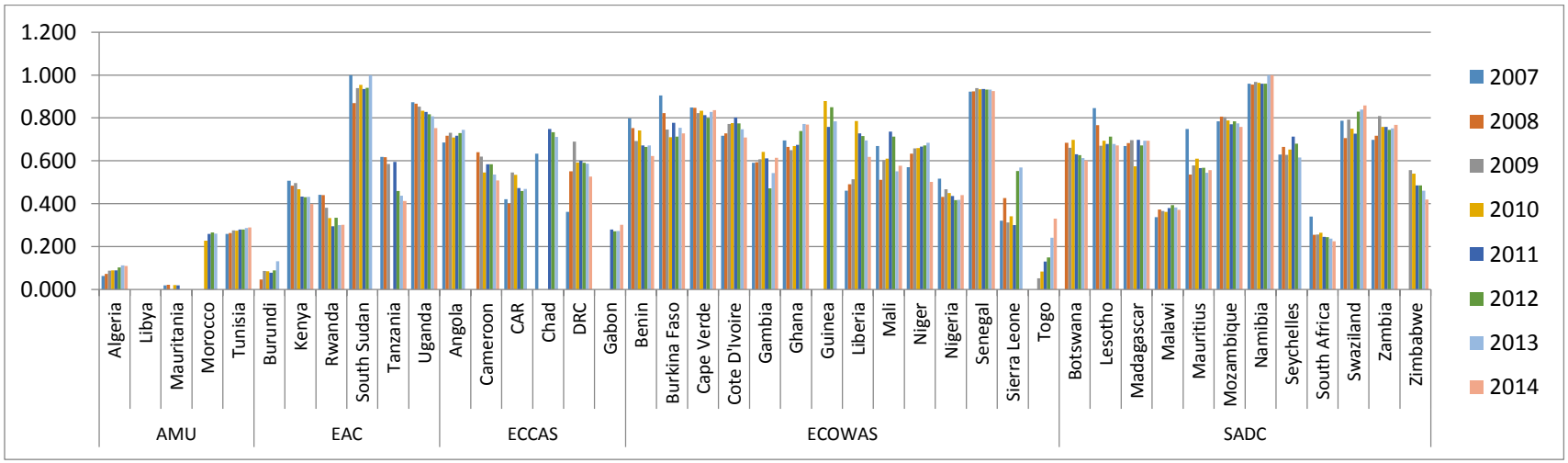


Source: Authors' calculations from World Bank's Global Financial Development Database (2016)

Appendix 2 B (iii): Financial integration in Africa: intra-REC summary: Regional Bank Assets

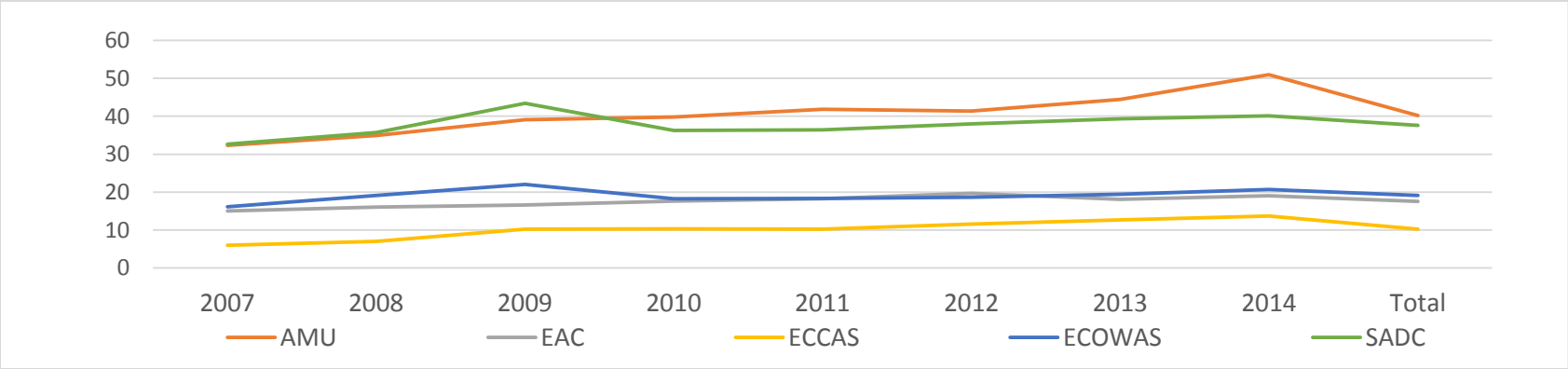


Appendix 2 B (iv): Financial integration in Africa: intra-REC summary: Gross Foreign Bank Assets

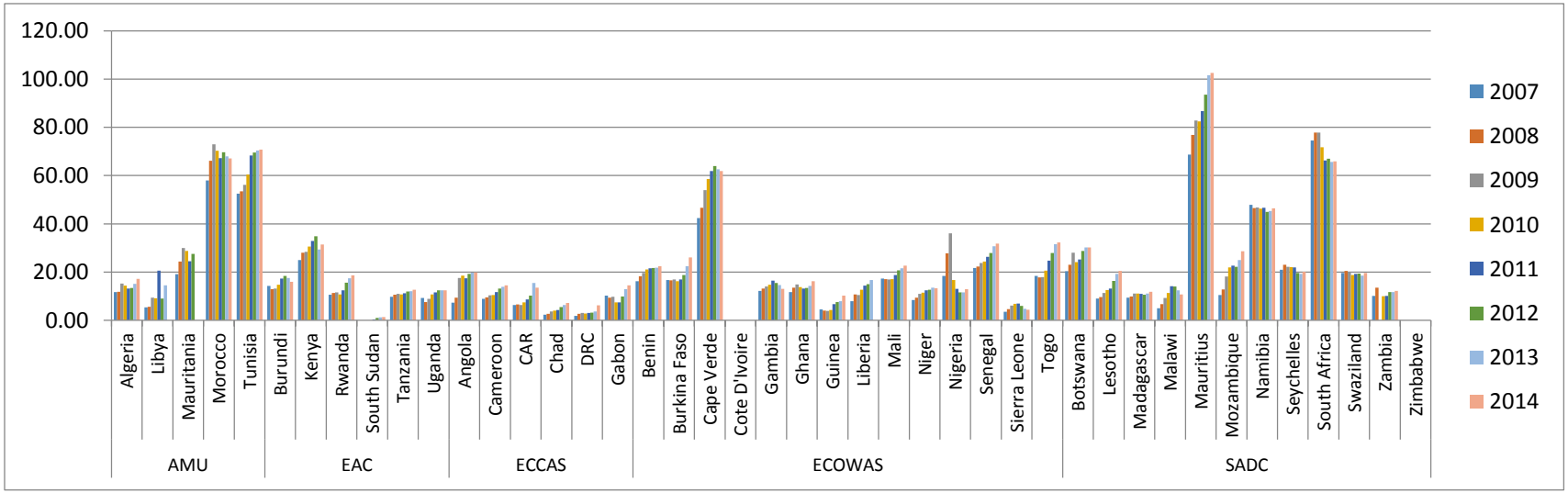


Source: Authors' calculations from Bankscope Database (2016).

Appendix 2 C (i): Private credit to domestic sector by banks as a percentage of GDP by REC

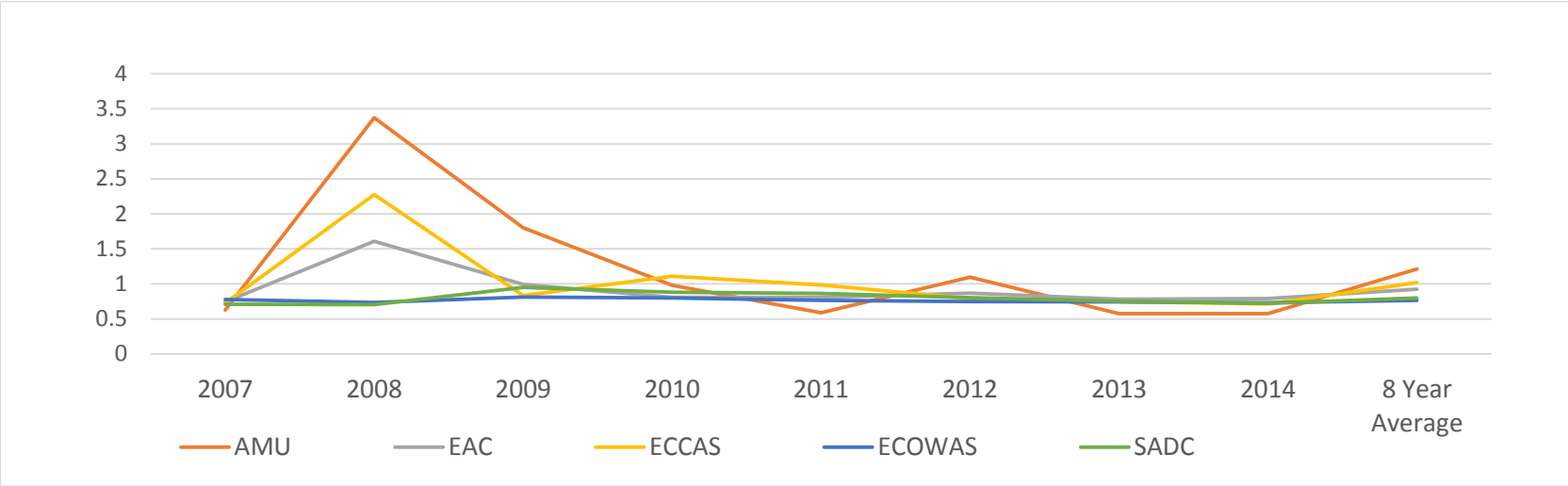


Appendix 2C (ii): Private credit to domestic sector by banks as a percentage of GDP Intra-REC



Source: Authors' calculations from World Bank's Global Financial Development Database (2016)

Appendix 2 D: Bank cost-to-income ratio in Africa's sub-regional markets



Source: Authors' calculations from bank financial statements on the Bankscope Database (2016).

CHAPTER THREE

FINANCIAL INTEGRATION AND BANK PROFITABILITY IN FIVE REGIONAL ECONOMIC COMMUNITIES OF AFRICA

3.1 Introduction

The last three decades have witnessed a rapid increase in financial integration in both advanced and emerging economies (Agenor, 2003). This has been inspired by the long-held view that financial integration and other variables which stimulate financial sector development are growth-enhancing (Schumpeter, 1911; McKinnon, 1973; Shaw, 1973). For instance, Giannetti and Ongena (2009) argue that financial integration enhances capital and institutional mobility across national borders, promotes financial sector development and financial inclusion (Beck et al., 2014). Therefore, countries seeking higher and faster economic growth view financial integration as an important catalyst for enhancing international participation, credit expansion and output growth (Saafi, Mohamed and Doudou, 2016). In view of this, many African countries have since the mid-to-late 1980s, implemented several financial reforms that have significantly altered the structure and conduct of their baking and other financial services industries overtime.

Over the past two decades, financial integration in Africa has accelerated foreign bank penetration and local banking sector growth, intensifying competition among financial intermediaries (Claessens and van Horen, 2014). These changes, coupled with the growing network of bank branches and subsidiaries across Africa ensures that capital promptly reaches the most rewarding investment opportunities in the region for higher efficiency and output growth (Beck et al., 2014; Claessens and van Horen, 2014; Leon, 2016). However, prior studies suggest that such a paradigm shift in banking activities has significant effects on bank profitability in emerging economies (Weill, 2013). For instance, Leon (2016) and Sissy et al. (2017) among others, contend that foreign direct investment and foreign bank penetration promote technology transfers to the domestic banking sector and enhances cost efficiencies and profitability. Luo et al. (2017) further suggest that increased competition from foreign banks promotes innovation in bank processes and products, which enhances profitability. In contrast, Claessens, Demirguc-Kunt and Huizinga (2001) contend that competitive pressure from foreign bank participation and domestic industry growth places a downward pressure on domestic banks' lending spreads, which reduces their profitability (Peria and Mody, 2004; Silva

and Pirtouscheg, 2015). Similarly, Ghosh (2016) found that despite improvements in bank cost efficiency, financial integration reduces bank profitability in 169 countries studied over the 1998-2013 period. Besides, the losses incurred by major banks during the recent global financial crisis have been blamed largely on unbridled financial integration and the need for financial intermediaries to increase their margins in a saturated marketplace (Lane, 2012). The outcome of the crisis casts major doubts on the often-heralded benefits of financial integration for the banking sector. However, in view of the empirical evidence supporting the positive effects of financial integration, Mishkin (2009) opines that the crisis should not be viewed as a slur on the benefits of financial integration but an opportunity to pursue a deeper understanding of the channels through which integration affects the economy. Also, Kose et al. (2009) suggests that the complexity of the risk-benefit nexus between financial integration and financial intermediaries' performance requires the tailoring of programs to specific country or regional settings to succeed.

In sum, the empirical evidence on the effects of financial integration on bank profitability is still uncertain and is compounded by the use of different proxies for bank profitability in the different studies. Also, there is a paucity of literature on the effect of financial integration on Africa's embryonic banking sector. Coupled with the lack of a comparative discourse, this gap clogs the ability of policy makers to harmonize legal frameworks and policy initiatives that increase the benefits of greater financial integration in Africa[9]. Also, though Ghosh (2016) includes 45 African countries in their study, several studies[10] find significant discrepancies in their results when large international samples are broken into regional and/or sub-regional samples supporting the argument by Kose et al. (2009). This chapter addresses these gaps by examining the effects of the ongoing financial integration in Africa on the overall profitability of banks in emerging economies using a sample of 405 banks operating in 47 countries across five regional economic communities of Africa for the period 2007-2014. It employs fixed effects and the dynamic two-step system generalized method of moments (GMM) estimation techniques to examine the effect of financial integration on bank profitability in Africa. The study controls for the effect of an array of firm, industry and macroeconomic variables to enhance the managerial, regulatory and policy implications of the findings

[9] Two key studies (AfDB, 2010; World Bank, 2007) which together examined Africa's financial integration across five RECs failed to account for the effect on overall bank profitability.

[10] See Andersen and Tarp (2003) and Masati et al. (2015) for studies where results vary when samples a limited to regional and sub-regional samples respectively.

The chapter therefore makes several contributions to the ongoing conversation on bank profitability determinants in emerging markets. First, the Standardized Bank Profitability Index (SBPI) constructed using principal components analysis allows the study to examine the effect of financial integration and other determinants of overall bank profitability from a more holistic perspective. Second, the chapter provides evidence of the varying effects of both *de jure and de facto* measures of financial integration in Africa. However, while the effects of the control variables are consistent with other earlier studies, cost-efficiency is found to have a negative effect on overall bank profitability in Africa. This could be attributed to the increased cost of diversification (Sissy et al., 2017) and higher non-performing loans within the period of the global financial crisis. Third, the chapter expands the limited studies on the impact of financial integration in Africa by examining the effects of both international and regional financial integration on bank profitability in the region. Finally, the chapter provides a comparative dimension by examining the results across five regional economic communities (RECs) of Africa, which serve as nodes of financial integration in the region.

The rest of the chapter is structured as follows: Section 3.2 reviews the theoretical and empirical literature on financial integration and bank profitability. Section 3.3 explains the data, variables and research methodology while Section 3.4 presents and discusses the results. Lastly, Section 3.5 concludes the chapter.

3.2 Literature review

Largely, bank profitability studies are guided by the relationship between bank market structure and profitability based on the Structure-Conduct-Performance hypothesis (SCP) and the Chicago Revisionist School (Efficient Structure Hypothesis). Proponents of the SCP paradigm argue that the behavior and performance of banks is primarily determined by the structure conditions in the market and so, in concentrated markets, few large banks collude to charge higher prices for their output (Bain, 1951; Stigler, 1964) or use their size to offer differentiated products and gain large market shares, thereby earning supernormal profits. In contrast, supporters of the Efficient Structure (ES) hypothesis contend that it is rather efficiency that determines the profitability of banks and not their market structure conditions (Demsetz, 1973).

Similarly, the empirical literature on the effect of financial integration on bank profitability is saddled with contentions. Theoretically, financial integration is identified as a major catalyst for promoting financial sector development, enhancing competition among financial intermediaries and forcing intermediaries to seek innovative and efficient ways to distribute capital and stay profitable (Amidu and Wilson, 2014; Moyo et al, 2014; Sissey et al., 2017). However, a section of the literature advocates that increased foreign bank participation and related competitive pressure induced by financial liberalization negatively correlates with bank profitability (Chelo and Manlagnit, 2011; Ghosh, 2016)[11]. For instance, Amidu and Wilson (2014) find that increased liberalization and foreign bank entry spur competition in domestic banking markets. This places a downward pressure on bank lending spreads (Peria and Mody, 2004; Silva and Pirtouscheg, 2015) and adversely affects their profitability (Chelo and Manlagnit, 2011; Ghosh, 2016). In response to falling market shares and reduced intermediation spreads, banks may engage in risky investment activities to maintain their profit profiles (Fiordelisi et al., 2011; Moyo et al., 2014), which to huge losses and a negative effect on profitability and bank stability (Aoki and Nikolov, 2015; Sissey et al., 2017). Additionally, Cetorelli and Goldberg (2011) argue that foreign banks were largely responsible for the transmission of the 2007 -2009 financial crises to emerging economies which led to major losses among banks globally. Therefore, structural changes resulting from financial integration could affect banks' ability to collude and reduce financial intermediation spreads, thus, impacting negatively on bank profitability. Moreover, Detraiache et al. (2008) suggest that though foreign bank presence may bring with it some efficiency gains from technological and managerial know-how spillovers, this is easily eroded by higher compliance cost, leading to a negative effect on bank profitability. Sehn, Wu and Lu (2009) added that the excessive cost of adopting innovative technologies, providing diversified products and serving new market segments leads to profit losses, especially in the short term. In line with this Ghosh (2016) finds that even though financial integration positively affects bank efficiency in 169 countries, profits are negatively affected.

In contrast, the empirical literature supporting a positive nexus between financial integration and bank profitability suggest that efficiency gains from foreign bank entry enhances the profitability of banks in an economy. For instance, Mishkin (2007) intimate that foreign banks from more advanced regulatory environments induce prudential regulatory reforms that goes to enhance the overall health of the domestic

[11] This is in line with the SCP hypothesis, which suggest that factors that distort the structure conditions and franchise values of banks reduce their pricing power from collusive behaviours or market share advantages and negatively affects their profitability.

banking sector. Similarly, Pohl (2011) finds that the technological and regulatory spillovers from foreign bank entry broadly enhance the efficiency and profitability of banks in Africa (Luo et al., 2017). According to Andries and Capraru (2013), foreign bank presence stimulates banking competition and compels domestic banks to pursue efficiency goals to stay profitable (Gamariel, 2015). Also, using a sample of 107 Chinese commercial banks, Luo et al. (2017) find a positive nexus between foreign bank branch network and bank efficiency, profitability and overall performance. In the same vein, Sissy et al. (2017) find evidence supporting a positive relationship between foreign bank entry and bank risk adjusted profits gained from diversification in a sample of 38 African countries. They argue that competitive pressures from foreign bank entry compels banks to diversify into previously untapped market segments, non-traditional income generating banking activities and other product innovations that help improve their overall profitability and stability. Also, empirical studies using *de facto* measures of financial integration often conclude that the latent benefits from increased foreign capital mobility to an economy as well as higher participation rates generally have a positive effect on banking profitability (Mishkin, 2007).

In sum, the empirical literature on the relationship between financial integration and bank profitability is uncertain. While it is still theoretically justifiable for African countries to escalate financial integration in a bid to enjoy its growth benefits, the empirical evidence on its effect on the banking sector is not always in support of this view. Taking stock of the contrasting arguments on the effect of financial integration on bank profitability, it is critical that bank managers, regulatory authorities and policy makers in Africa are continually provided with empirical evidence on the effect of the region's ongoing integration on bank profitability in the region. This will ensure policy initiatives and actions that will allow Africa to enjoy the benefits of integration while avoiding the pitfalls.

3.3 Data and methodology

The objective of this chapter is to examine the effect of financial integration on bank profitability in Africa's regional economic communities. For this purpose, this study estimates the following static and dynamic panel models based on Luo et al. (2017), Garcia and Guerreiro (2016) and Ghosh (2016) among others:

$$\mathrm{BP_{i,t}} = \alpha_{i,t} + \beta_1 FI_{j,t} + \sum \beta_k X_{i,t} + \sum \beta_l Z_{j,t} + \sum \beta_m M_{j,t} + \theta YD_t + \varepsilon_{i,t} \quad (1)$$

$$\mathrm{BP_{i,t}} = \alpha_i + \delta \mathrm{BP_{i,t-1}} + \beta_2 \mathrm{FI_{j,t}} + \sum \beta_k \mathrm{X_{i,t}} + \sum \beta_l \mathrm{Z_{j,t}} + \sum \beta_m \mathrm{M_{j,t}} + \varepsilon_{it} \quad (2)$$

where $BP_{i,t}$ is the dependent variable representing bank i's profitability at time t. This is proxied by the standardized bank profitability index (SBPI) and subsequently by return on assets (ROA). $FI_{j,t}$ represents financial integration for each country at time t while $X_{i,t}$, $Z_{j,t}$ and $M_{j,t}$ are vectors of bank-level, industry-level and macroeconomic controls respectively. Also, $\alpha_{i,t}$ represent the bank-specific intercept; YD_{it} is a year dummy while ε_{it} is the error term. δ represents persistence of bank profits and is between the values of 0 and 1, with higher values denoting more persistence and a less competitive banking industry[12].

Following the extant literature (Luo et al., 2017; Garcia and Guerreiro, 2016; Ghosh, 2016; Sissy et al., 2017), the study first estimates the static model in Equation 1 using the panel fixed effects and random effects estimation techniques for the full sample. These static models control for the effect of time-variant unobserved heterogeneity in the model (Ghosh, 2016). Second, the dynamic framework in Equation 2 is implemented using the two-step system GMM estimator of Arellano and Bover (1995) and Blundell and Bond (1998) with Windmeijer (2005) correction for standard errors. According to Roodman (2009), the two-step system GMM estimator helps improve the efficiency of the model by dealing with such challenges as endogeneity problems, unobserved heterogeneity and profit persistence. For instance, bank specific variables are affected by current and/or previous bank performance and these variables may be endogenously determined in the model. Besides, bank performance in one year could affect subsequent year bank performance levels which all pose endogeneity concerns. Also, bank profit persistence reveals their ability to harness the benefits of their market power through product diversification and innovative distribution systems. The two-step system GMM estimator therefore uses lagged values of the dependent variables in levels and changes in each dependent variable and each endogenous regressor as instruments. Besides, the methodology helps account for effects of the competitive conduct of banks in response to market structure changes resulting from increased financial integration on their profitability. It also more adequately addresses the issue of unit roots for dynamic panels and produces more efficient results for large N and small t panels like our sample (Tan, 2016; Roodman, 2009).

To measure the dependent variable, the study first estimates four widely used proxies of bank profitability: return on assets (ROA), return on equity (ROE), net interest margin (NIM) and non-interest income margin (NON). Second, the study estimates a standardized bank profitability index (SBPI) using principal

[12] The two models are applied on the entire sample, but only the system dynamic two-step system GMM methodology is used in the sub-regional estimations.

components analysis (PCA) of the four proxies[13]. Following the work Pradhan et al. (2014), the bank profitability index is constructed as follows[14]:

$$\mathrm{BPI}_{i,t} = \sum_{i=1}^{4} w_{i,t} \frac{X_{i,t}}{\mathrm{Sd}X_i} \qquad (3)$$

where $BPI_{i,t}$ is the bank profitability index, Sd is the standard deviation of all variables, X_{it} is the ith original proxy for bank profitability in year t; and w_{it} is factor loadings derived from PCA. Equation 3 allows us to transform the original variables into uncorrelated components that are orthogonal to each other and helps reduce the number of latent variables used to explain bank profitability while accounting for most of the variance in the original set of proxies used[15].

However, the study applies the commonly used stopping rule where only those components with an eigenvalue of 1 or more are included in the construction of the index. Therefore, conducting a principal components analysis of the four proxies, the study finds that the first two principal components (Component 1 and 2) have eigenvalues greater than 1 each and the cumulatively account for 79.93% of the variations in the four bank profitability indicators. Component 1 accounts for 52.47% of the variations while component 2 accounts for 27.46% of the variations. Therefore, the banking profitability index is constructed using the following equation from Luo et al. (2017):

$$\mathrm{BPI}_{i,t} = \left(\frac{0.5247}{0.7993}\right) \left[\text{Component 1 Score}_{i,t}\right] + \left(\frac{0.2746}{0.7993}\right) \left[\text{Component 2 Score}_{i,t}\right] \qquad (4)$$

The component scores for each bank is computed based on the work of Pradhan et al. (2014) as follows;

$$\text{Component m score} = a_{m1}X_1 + a_{m2}X_2 + a_{m3}X_3 + a_{m4}X_4 \qquad (5)$$

[13] The rational for using a composite measure of performance such as the standardized bank profitability index is that individually, each original proxy captures a distinct aspect of bank profitability without accounting for the overall profitability of a bank. Also, each proxy estimates the benefits of banking operations to peculiar groups of stakeholders. In view of this, Luo et al. (2017) argue that a composite measure of bank profitability allows for a broader assessment of its determinants and promotes more holistic managerial and policy initiatives that enhance total value maximization for a greater spectrum of stakeholders.

[14] PCA helps solve this problem of multicolinearity by transforming the original variables into uncorrelated components that are orthogonal to each other.

[15] See Pradhan et al. (2014) for a more detailed explanation of the PCA process. For the study sample, BPI captures the statistical correlations between the four proxies of bank profitability employed (ROA, ROE, NIM, NON), assigning weights to those proxies most correlated with the other proxies in the dataset.

where a_{ij} are component loadings and X_i refers to the original profitability measures. The component loadings represent weights, indicating the contribution of principal components to the variability in the original data set. However, as observed by Luo et al (2017) the use of PCA results in either positive of negative index values, making interpretation of the results challenging. The study therefore adopts the following formula from Shih, Zhang and Liu (2007) to standardize the index:

$$\mathrm{SBPI_{i,t}} = \left(\frac{\mathrm{BPI_{i,t}} - \mathrm{minBPI_{i,t}}}{\mathrm{maxBPI_{i,t}} - \mathrm{minBPI_{it}}} \right) \qquad (6)$$

where $\mathrm{minBPI_{i,t}}$ and $\mathrm{maxBPI_{i,t}}$ represent the minimum and maximum values of the index in the study sample. The resulting standardized banking profitability index has values ranging from 0 to 1, with higher values denoting better bank profitability and vice versa. In line with the literature, the study expects financial integration to have a positive effect on overall banking profitability in Africa.

The main test variable, financial integration is estimated using both *de jure* and *de facto* measures to account for the policy and practical implications of financial integration for bank profitability[16]. First, the study uses the financial freedom index, a widely used measure of capital accounts liberalization, to proxy for the degree of financial openness for both foreign and local participation as well as the level of independence financial markets and institutions have from government interference. Therefore, higher index values denote greater financial freedom and vice versa. Second, the study uses the percentage of Net Inflows of Foreign Direct Investment to GDP from the WDI database as a *de facto* measure of financial integration. Net FDI inflows reflect the capital, knowledge and technological spillovers and other latent benefits that come with FDI inflows and foreign participation in domestic markets. Increased values are expected to positively influence capital accumulation, the scale of banking activities as well as bank performance in a country (Sissy et al, 2017). The study preferred the Net FDI to GDP over other *de facto* measures like the Lane and Milessi-Ferreti (2007) international financial integration index due to data availability for an extensive study of Africa's financial integration. Additionally, the study uses the ratio of total foreign banks' assets to total assets of the banking industry in each country as well as total regional

[16] According to Dell'Ariccia et al. (2008) though capital accounts liberalization is expected to promote capital mobility, this might not always be the case and the inferences drawn from using one may not always apply to the other (Quinn, Schindler and Yoyoda, 2011). The study therefore employs four different measures of financial integration in the empirical analysis to account for the effect of capital accounts liberalization policies (de jure measures) and actual capital flows across countries (de facto measures).

banks' assets to total assets of the banking industry to account for the different effects of general international cross border banking and regional cross-border banking respectively (Shen et al., 2009)[17].

The study employs several controls shown by prior studies to affect the level of bank profitability (Dietrich and Wanzenried, 2014; Luo et al., 2017; Garcia and Guerreiro, 2016; Ghosh, 2016). Firm level controls include: bank capitalization measured as the ratio of total equity to total assets (Tan and Floros, 2012; Dietrich and Wanzenried, 2014); liquidity is measured as the ratio of liquid assets[18] to deposits and short-term funding (Francis, 2013; Ghosh, 2016); credit risk is estimated as the ratio of non-performing loan to total loans (Garcia and Guerreiro, 2016); efficiency is measured as the ratio of bank overhead costs to total assets (Masood and Ashraf, 2012; Garcia and Guerreiro, 2016). Income diversification is measured as the Herfindahl-Hirschman Index (HHI) of bank revenue (Ghosh; 2016; Sissy et al, 2017). Also, market concentration measured as HHI of gross loans and banking sector development, proxied by the level of domestic credit to the private sector by banks are included as industry level controls. The study also includes GDP growth rate and inflation to account for the effect of variations in the macroeconomic environment of banks.

The empirical analysis is based on an unbalanced panel comprising data from 405 commercial banks operating in 47 countries across five RECs of Africa for the period 2007– 2014. This constitutes some total of 2837 bank-year observations. Bank financial statements were collected from the Bankscope database of Bureau Van Dijk (2015) while industry and macroeconomic data was collected from the World Development Indicators (WDI) database of the World Bank Group (2016). Additionally, the study sourced financial freedom index (FI) data from the Economic Freedom Index database of the Heritage Foundation (2016). For computational reasons and consistent with the works of Maechler and McDill (2003), the study sample excluded banks for which we could not obtain accurate data for at least half of the study period. Therefore, the study sample includes only banks that had data available for at least half of the study period.

[17] A foreign bank refers to any bank with majority foreign shareholding and regional bank refers to a foreign bank whose majority shareholders are of African origins but outside the country under consideration. Both are computed by the authors from the Bankscope data. These are improvements on earlier studies on Africa which use dummies to proxy for foreign bank participation.

[18] This comprises "cash and due from banks, trading securities and at fair value through income, loans and advances to banks, as well as reverse repos and cash collaterals" with a year or less maturities (Čihák et al., 2012, Ghosh, 2016).

3.4 Empirical results

Table 3.1 presents descriptive statistics for the variables used in the model. The figures all seem reasonable and in line with those reported by previous studies. Table 3.1 shows that net income in African banks is generally low, ranging from -0.003% to 0.037% and averaging at 0.017% of total assets value. However, the study finds that total profitability of the banks, measured by the SBPI is quite within acceptable levels as this falls between 0.448% percent of all income generating activities and ranges from 0.158 to 0.769%. Comparing the mean return on assets for the five sub-regional settings, the study finds that SADC banks lead the region on return on assets while AMU banks seem to be the least performing banks in Africa. Also, the pairwise correlation coefficients and their respective statistical significance are presented in Tables 3.2. The correlation coefficients for all independent variables used in the study are below 0.7, thus show no signs of multicolinearity (Kennedy, 2008).

The regression results are reported in Tables 3.3 – 3.5. Columns a, b, c and d in these tables examine the effects of financial integration by using financial freedom index (FI), net foreign direct investment to GDP (FDI), Foreign bank participation (INTFI) and regional bank participation (REGFI) respectively. Table 3.3 presents the results for both fixed and random effects models for the benchmark equation (Eqn. 1). In Table 3.4, the two-step system GMM estimation results are reported for both the standardized Bank Profitability Index (SBPI) and the return on Assets (ROA). Table 3.5 (A and B) compare the results for the standardized Bank Profitability Index across the five regional economic communities of Africa. The results for the control variables are in line with expectations.

Table 3.4 shows the results from applying the two-step system GMM estimator to examine the determinants of bank profitability in Africa. The first part of Table 3.4 presents regression results for the full sample of 405 African banks using the standardized bank profitability index constructed from principal components analysis of four key bank profitability measures, ROA, ROE, NIM NONIM. The Wald X^2 shows the joint significance of the variables and the Hansen test shows no signs of over-identifying restrictions. The second part of Table 3.4 presents results for bank return on assets. Though the estimations show the presence of first order autocorrelation, they are deemed consistent as they satisfy the Arellano and Bond (1991) test for second order autocorrelation. The results show that apart from the net inflows of foreign direct investment to GDP, both *de jure* and *de facto* measures of international financial integration as well as the proxy for regional financial integration positively and significantly affect bank profitability at the 5% and 10% respectively. The results suggest that both the liberalization of financial markets in Africa and the

activities of foreign and regional banks have positively impacted on the overall profitability of banks in the region. The insignificance of net flows of FDI to GDP implies that the technological benefits derived by African banks from financial integration could be attributed to the activities of foreign and regional banks and not the general inflow of foreign direct investments per se. overall, the results of the four measures of financial integration and the broad measure of banking profitability provide robust evidence in support of a positive nexus between financial integration and bank profitability in Africa. The study also finds evidence of profit persistence in the banking industry in Africa, reflecting the dynamic nature of the model and the low level of competition in the banking sector of Africa. This is evidenced by the significance of coefficients of the lagged dependent variables which ranges between the values of 0.6445, 0.6541, 0.6645 and 0.6750 for the estimations with international bank assets, financial freedom, regional bank assets and foreign direct investment to GDP respectively. These results are consistent in both the static and dynamic models.

On the effects of the control variables, the study finds that the coefficients of bank operating cost to total assets are positively and significantly related to the standardized bank profitability index, suggesting that increased bank expenses within the study period impacted positively on profitability. This finding is in line with Tan (2016) who found a similar relationship for the Chinese banking sector for the period 2003-2011. Considering the timing of the two studies, it is intuitive to interpret this to mean that during periods of financial crisis and rising non-performing loans, banks that are willing to increase their expenses on loan collection and revenue diversification activities increase their profitability. Market share has a significant positive effect on bank profitability when financial freedom and foreign bank assets are used as proxies for financial integration. This suggest that in the presence of bank globalization, a bank with a large market share is in a better position to provide diversified products, beat the competition and stay profitable.

Regarding the industry-level variables, the study finds that neither competition nor diversification significantly determine the overall level of bank profitability in Africa. However, the coefficients of banking sector development show that greater banking sector development in Africa has a significant inverse relationship with the standardized bank profitability index at the 1% level. Given that the study covers the entire period of the global financial crisis of 2008, this finding suggests that in emerging economies, banks operating in regions with more developed banking markets are more exposed to the negative effects of a global financial crisis and may thus suffer significant loses. This contrasts with earlier studies by Tan (2016) who found a positive relationship between banking market development and bank profitability among Chinese banks.

Table 3.1: Summary statistics

Variable	FULL SAMPLE (Africa)					SUB-REGIONAL MARKETS									
						AMU		EAC		ECCAS		ECOWAS		SADC	
	Mean	SD.	Min	Max	N	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.	Mean	SD.
SBPI	0.448	0.200	0.158	0.769	2834	0.279	0.160	0.491	0.179	0.500	0.171	0.483	0.185	0.498	0.206
ROA	0.017	0.013	-0.003	0.037	2834	0.012	0.011	0.018	0.014	0.016	0.013	0.017	0.012	0.019	0.012
CAR	0.124	0.051	0.061	0.223	2834	0.123	0.060	0.140	0.044	0.118	0.050	0.115	0.048	0.125	0.053
OCA	0.050	0.027	0.017	0.097	2834	0.026	0.013	0.060	0.024	0.060	0.026	0.057	0.021	0.054	0.027
NPLR	0.013	0.013	0	0.040	2816	0.011	0.011	0.012	0.013	0.015	0.014	0.016	0.014	0.011	0.012
LIQ	0.411	0.205	0.153	0.783	2823	0.448	0.250	0.356	0.180	0.485	0.190	0.375	0.193	0.422	0.203
DIV	0.360	1.893	-92.89	0.5	2825	0.109	4.882	0.423	0.101	0.398	0.154	0.395	1.120	0.412	0.259
HHI	0.227	0.137	-0.39	1	2838	0.207	0.084	0.153	0.122	0.276	0.140	0.214	0.135	0.282	0.108
MSH	0.115	0.114	0.006	0.342	2837	0.102	0.102	0.069	0.088	0.139	0.123	0.144	0.114	0.139	0.124
FSD	26.62	21.38	0.416	108.02	2661	40.333	25.915	18.58	8.182	12.367	6.887	20.328	12.302	39.136	30.486
GDP	5.33	7.09	-62.08	104.49	2834	3.647	16.661	5.734	4.312	5.817	5.700	5.940	3.477	4.994	3.254
INFL	7.60	4.30	1.63	15.22	2829	4.347	2.461	9.065	3.926	7.756	5.087	7.255	4.728	7.003	3.384
FI	45.24	13.09	10	70	2702	34.189	11.940	49.966	7.451	36.692	10.042	46.119	11.001	50.797	16.008
FDI	4.17	6.14	-5.98	84.95	2819	3.122	3.820	2.722	1.991	0.669	3.821	5.703	7.712	6.414	8.025
INTFI	0.502	0.257	0	1	2837	0.155	0.110	0.542	0.193	0.601	0.151	0.641	0.188	0.605	0.204
REGFI	0.22	0.22	0	1	2837	0.027	0.038	0.201	0.188	0.231	0.162	0.382	0.194	0.260	0.259

Table 3.2: Pairwise correlation matrix

	SBPI	ROA	CAR	OCA	NPL	LIQ	DIV	HHI	MSH	FSD	GDPG	INFL	FI	FDI	INTFI	REGFI
SBPI	1.000															
ROA	0.727***	1.000														
CAR	0.291***	0.262***	1.000													
OCA	0.476***	-0.113***	0.227***	1.000												
NPL	0.133***	-0.188***	0.054**	0.267***	1.000											
LIQ	0.070***	0.028	0.144***	-0.004	0.037*	1.000										
DIV	0.045**	0.041**	0.019	0.035*	0.037**	0.012	1.000									
HHI	0.085***	0.037**	-0.105***	-0.003	-0.021	0.234***	0.010	1.000								
MSH	0.115***	0.113***	-0.312***	-0.059**	-0.009	-0.091***	0.026	0.469***	1.000							
FSD	-0.390***	-0.123***	-0.136***	-0.418***	-0.164***	-0.188***	-0.041**	-0.089***	-0.097***	1.000						
GDP	0.094***	0.048**	0.024	0.095***	0.040**	0.034*	-0.005	-0.083***	-0.049**	-0.131***	1.000					
INFL	0.236***	0.174***	0.143***	0.135***	0.093***	0.163***	0.019	-0.175***	-0.179***	-0.262***	0.089***	1.000				
FI	0.006	0.099***	-0.060**	-0.049**	-0.066***	-0.194***	0.026	-0.093***	-0.099***	0.294***	-0.027	0.064***	1.000			
FDI	0.102***	0.000	0.004	0.117***	0.106***	0.115***	0.008	0.247***	0.143***	-0.065***	0.061***	0.009	0.028	1.000		
INTFI	0.250***	0.070***	-0.050**	0.336***	0.081***	-0.104***	0.023	0.042**	0.113***	-0.194***	0.041**	0.005	0.384***	0.176	1.000	
REGFI	0.275***	0.086***	-0.040**	0.297***	0.090***	-0.042**	0.012	0.289***	0.345***	-0.292***	0.009	-0.072***	0.056	0.116	0.603	1.000

Sources: World Development Indicators Database of the World Bank Group and Authors' estimation from Bank scope data for 405 banks across 47 African countries for the period 2007-2014. *, **, *** implies statistical significance at 10%, 5%, and 1% respectively.

The results of the macroeconomic controls suggest that GDP growth has a significant positive relationship with bank profits at the 5% level. Comparable results are reported in earlier studies by Masood and Ashraf (2012) and Perara et al. (2013), who explain that a growing economy is profit-enhancing as it increases loan demand and reduces loan default rates. Finally, inflation shows a significant positive coefficient at the 1% level, reflecting the benefits derived by banks in an environment with high economic volatility, which allows them to earn more from their core intermediation activities of lending. Earlier studies by Tan and Floros (2012) and Trujillo-Ponce (2013) explain that banks can earn more on their loans and other interest-earning activities in a high inflation environment. These findings are consistent with the results of prior studies and meet the study's a-priori expectations.

The second half of Table 3.4 presents the two-step system GMM estimation results using return on assets (ROA) as an alternative proxy for bank profitability. The results show that both *de jure* and *de facto* financial integration have a positive and statically significant effect on bank profitability. The coefficients of the lagged values of return on assets are significant and confirm the dynamic nature of the model. Also, the significance of these coefficients, which range between 0.4515 and 0.6894, further affirms that both aggregate measures of bank profitability and the ROA persist overtime and that generally, banking markets in Africa are at best imperfectly competitive. The results of the ROA are consistent with that of the SBPI and show that all measures of financial integration except net flows of FDI to GDP are have a positive and significant effect on bank ROA at the 5% level. This reflects the positive effect of financial openness, foreign bank participation and regional cross-border banking activities on bank profitability in developing economies.

The results further show that some key control variables affect ROA differently from the overall bank profitability measure (SBPI). The coefficient of operating cost is negative and statistically significant at the 5% level for all measures of financial integration, suggesting that a reduction in bank operating cost due to competitive pressures from foreign and regional banks exert a positive influence on bank profitability in Africa. This is consistent with earlier studies (Flamini et al., 2009; Francis, 2013; Ghosh, 2016; Sissy et al., 2017) which find that improved cost management in banks improves profitability. Non-performing loans is found to be negatively and significantly related to ROA at the 1% level. This indicates that poor asset quality among banks impacts negatively on profitability.

Table 3.3: Results for Standardized Bank Profitability Index (SBPI): Fixed and random effects (full sample)

	(a)		(b)		(c)		(d)	
	FE	**RE**	**FE**	**RE**	**FE**	**RE**	**FE**	**RE**
Constant	0.2911	**0.1992*** **	**0.2971*** **	**0.2450*** **	**0.2682*** **	**0.1986*** **	**0.2803*** **	**0.2246*** **
	(0.0313)	(0.0262)	(0.0227)	(0.0207)	(0.0296)	(0.0229)	(0.0236)	(0.0208)
FI	0.0002	**0.0010** **						
	(0.0005)	(0.0004)						
FDI			-0.0001	0.0005				
			(0.0005)	(0.0005)				
INTFI					0.0587	**0.0991*** **		
					(0.0391)	(0.0225)		
REGFI							**0.1039** **	**0.1346*** **
							(0.0419)	(0.0254)
CAR	**0.7559*** **	**0.8265*** **	**0.7318*** **	**0.8185*** **	**0.7308*** **	**0.8294*** **	**0.7172*** **	**0.8014*** **
	(0.0827)	(0.0740)	(0.0821)	(0.0736)	(0.0819)	(0.0732)	(0.0820)	(0.0731)
OCA	**1.1640*** **	**1.8700*** **	**1.0920*** **	**1.7600*** **	**1.0930*** **	**1.6350*** **	**1.1250*** **	**1.6560*** **
	(0.2215)	(0.1826)	(0.2219)	(0.1820)	(0.2212)	(0.1835)	(0.2213)	(0.1820)
NPL	**-0.4752** **	**-0.4299** **	**-0.3540** *	-0.3159	-0.3441	-0.2834	**-0.3698** *	-0.3247
	(0.2143)	(0.2086)	(0.2139)	(0.2075)	(0.2125)	(0.2058)	(0.2126)	(0.2055)
LIQ	-0.0093	0.0093	-0.0166	0.0006	-0.0200	8.58e-6	-0.0139	0.0043
	(0.0184)	(0.0169)	(0.0184)	(0.0169)	(0.0184)	(0.0168)	(0.0184)	(0.0168)
DIV	-0.0004	-0.0003	-0.0004	-0.0002	-0.0003	-0.0002	-0.0003	-0.0001
	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)	(0.0011)
HHI	**-0.0934** **	**-0.0770** **	-0.0561	-0.0345	-0.0552	-0.0307	-0.0594	-0.0482
	(0.0437)	(0.0371)	(0.0424)	(0.0360)	(0.0421)	(0.0354)	(0.0420)	(0.0355)
MSH	0.0575	**0.2726*** **	0.0535	**0.2401*** **	0.0470	**0.2254*** **	0.0375	**0.1862*** **
	(0.0725)	(0.0514)	(0.0719)	(0.0512)	(0.0719)	(0.0508)	(0.0719)	(0.0517)
FSD	-0.0003	**-0.0017*** **	-0.0003	**-0.0017*** **	-0.0003	**-0.0015*** **	-0.0005	**-0.0015*** **
	(0.0004)	(0.0003)	(0.0005)	(0.0003)	(0.0005)	(0.0003)	(0.0005)	(0.0003)
GDP	0.0004	0.0004	0.0002	0.0001	0.0003	0.0003	0.0003	0.0003
	(0.0003)	(0.0003)	(0.0004)	(0.0004)	(0.0003)	(0.0003)	(0.0003)	(0.0003)
INFL	**0.0032*** **	**0.0039*** **	**0.0038*** **	**0.0044*** **	**0.0036*** **	**0.0042*** **	**0.0038*** **	**0.0046*** **
	(0.0007)	(.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)	(0.0007)
Diagnostics								
R^2	0.3250	0.4564	0.3172	0.4254	0.3505	0.4410	0.3875	0.4321
Hausman test	87.56***	87.56***	81.29***	81.29***	70.04***	70.04***	57.48***	57.48***
F-stat/ Wald χ^2	11.11***	414.19***	10.93***	392.75***	10.64***	422.34***	10.83***	429.08***
Observations	2550	2550	2614	2614	2621	2621	2621	2621
Banks	370	370	385	385	385	385	385	385

Notes: Robust standard errors are reported in parenthesis. *, **, *** implies statistical significance at 10%, 5%, and 1% respectively and coefficients in bold are statistically significant. The diagnostic test reported include; (1) the Hausman specification test p-value; (2) the R square value; (3) F-statistic and Wald-chi to indicate the joint significance of the fixed and random effects models respectively; (4) number of observations; and (5) the number of banks used in the estimation.

Table 3.4: Two-step system GMM results for SBPI and ROA

	Standardized Bank Profitability Index				Return on Assets			
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)
Constant	0.0057	0.0096	-0.0019	0.0106	0.0050	**0.0095*** **	0.0038	**0.0054***
	(0.0366)	(0.0342)	(0.0344)	(0.0339)	(0.0044)	(0.0027)	(0.0031)	(0.0030)
$DepVar_{(t-1)}$	**0.6541*** **	**0.6750*** **	**0.6445*** **	**0.6645*** **	**0.4880*** **	**0.6894*** **	**0.4515****	**0.4668*** **
	(0.1130)	(0.1245)	(0.1301)	(0.1249)	(0.1316)	(0.0747)	(0.1534)	(0.1438)
FI	**0.0006***				**0.0001****			
	(0.0004)				(3.61e-5)			
FDI		0.0002				0.0001		
		(0.0005)				(3.21e-5)		
INTFI			**0.0387***				**0.0046****	
			(0.0224)				(0.0020)	
REGFI				**0.0488****				**0.0047****
				(0.0201)				(0.0016)
CAR	0.2434	0.3735	0.4210	0.3447	0.0333	-0.0103	**0.0651****	**0.0599***
	(0.3579)	(0.3673)	(0.3750)	(0.3632)	(0.0408)	(0.0246)	(0.0332)	(0.0311)
OCA	**1.3020*** **	**1.1830*** **	**1.1470*** **	**1.1430*** **	**-0.0587****	**-0.0363****	**-0.0852****	**-0.0788*** **
	(0.2842)	(0.2903)	(0.2704)	(0.2758)	(0.0260)	(0.0148)	(0.0269)	(0.0239)
NPL	-0.3484	-0.3391	-0.3068	-0.3390	**-0.1608*** **	**-0.1503*** **	**-0.1577*** **	**-0.1572*** **
	(0.2305)	(0.2221)	(0.2265)	(0.2218)	(0.0249)	(0.0207)	(0.0247)	(0.0243)
LIQ	0.0157	0.0057	0.0102	0.0104	-0.0004	-0.0005	-0.0008	-0.0007
	(0.0160)	(0.0146)	(0.0154)	(0.0153)	(0.0014)	(0.0013)	(0.0013)	(0.0013)
DIV	0.0003	0.0003	0.0002	0.0003	**0.0001***	**0.0001****	**0.0001***	**0.0001****
	(0.0003)	(0.0003)	(0.0003)	(0.0003)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
HHI	-0.0191	-0.0026	-0.0080	-0.0182	-0.0045	-0.0018	-0.0042	-0.0047
	(0.0305)	(0.0295)	(0.0285)	(0.0285)	(0.0030)	(0.0026)	(0.0030)	(0.0029)
MSH	**0.1239***	0.1166	**0.1220***	0.0930	**0.0128***	0.0013	0.0139**	**0.0113***
	(0.0704)	(0.0720)	(0.0708)	(0.0653)	(0.0076)	(0.0049)	(0.0068)	(0.0063)
FSD	**-0.0005****	**-0.0004***	**-0.0004***	-0.0003	**-0.0001*** **	**-0.000*** **	**-0.0001*** **	**-0.0001*** **
	(0.0003)	(0.0002)	(0.0002)	(0.0002)	(1.92e-5)	(1.39e-5)	(0.0001)	(1.56e-5)
GDP	**0.0009****	**0.0007***	**0.0007****	**0.0007****	**0.0001****	**0.0001****	**0.0001****	**0.0001*** **
	(0.0003)	(0.0004)	(0.0003)	(0.0003)	(2.37e-5)	(2.42e-5)	(2.38e-5)	(2.44e-5)
INFL	**0.0034*** **	**0.0036*** **	**0.0036*** **	**0.0037*** **	**0.0003*** **	**0.0003*** **	**0.0003*** **	**0.0003*** **
	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0001)	(0.0001)	(0.0001)	(0.0001)
Diagnostics								
Wald χ^2	2637.54***	2652.35***	2416.03***	2750.92***	486.38 ***	684.47***	443.88***	477.86***
Obs.	2171	2207	2214	2214	2171	2207	2214	2214
Banks	370	380	380	380	370	380	380	380
Instruments	36	36	36	36	29	33	36	36
AR(1):	0.000	0.000	0.000	0.000	0.00)	(0.000	0.000	0.000
AR(2):	0.222	0.227	0.232	0.230	0.145	0.105	0.152	0.136
Hansen:	0.769	0.792	0.820	0.841	0.173	0.226	0.130	0.163

Notes: Robust standard errors are reported in parenthesis. *, **, *** implies statistical significance at 10%, 5%, and 1% respectively and coefficients in bold are statistically significant. The diagnostic test reported include; (1) Wald χ^2 for the joint significance of instruments, (2) the instrument count, (3) number of observations, (4) number of banks used in the estimation, (5) p-values of the Arellano-Bond test for first and second order serial correlation in the residuals where the null hypothesis is that there is no serial correlation (6) p-value of the Hansen test of over identifying restrictions with the null hypothesis being that instruments are exogenous.

Similar findings have been reported in previous studies and reflect the adverse effects of information asymmetry and its associated perils of poor loan quality on bank profitability. Also, banking sector development has a negative and significant coefficient, implying that, higher banking sector development and commensurate lending activities of banks in Africa reduces bank profits. This may be explained by the high default risk in the region. However, diversification shows a positive effect on ROA. The positive coefficient, which is significant at the 5% for models involving financial freedom and international bank assets to total bank assets and at the 10% levels for models involving net flows of FDI to GDP and regional bank assets to total bank assets respectively. This is explained by the fact that a bank's ability to earn revenue from non-traditional activities has a positive effect on its return on assets. These findings are similar to the results from the estimations involving the standardized bank profitability index and are consistent with the extant literature.

3.4.1 Sub-regional comparison

Table 3.5 (A and B) presents the results for the five regional economic communities of Africa. The comparison is necessary as the RECs in Africa serve as key nodes of regional financial integration, with each pursuing different but related financial integration goals with the aim of providing the foundations for broader financial integration in Africa. The results show variations in the effects of the different financial integration measures on bank profitability as well as that of the control variables.

The AMU records no significant effect of financial integration on bank profitability. The study finds that despite high levels of banking sector development, the region has the lowest average levels of foreign and regional bank participation as well as limited financial freedom (Table 3.1). Therefore, despite exerting a positive effect on bank profitability, the low levels of financial freedom and FDI inflows have at best, an insignificant positive effect on overall bank profitability in the AMU. The effect of foreign and regional bank participation is seen to be negative and insignificant. In the EAC, the results show that financial freedom and regional banking activities have a significantly positive effect on overall bank profitability at the 5% and 10% level respectively. This suggest that financial liberalization policies and the regional integration efforts in the EAC, coupled with other factors positively and significantly impacts on the profitability of banks operating in the sub-region. However, though insignificant, foreign direct investments in the EAC negatively affect bank profitability in the region. The results for ECCAS show that apart from the financial freedom index, all other measures of financial integration have positive and significant effects on bank profitability.

Table 3.5 (A): Financial integration and bank profitability: Sub-regional analysis using two-step system GMM

SBPI	**AMU**				**EAC**			
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)
Constant	**0.1135***	**0.1058***	**0.1084****	**0.1156***	**-0.2129****	0.0613	-0.0734	-0.0593
	(0.0689)	(0.0576)	(0.0542)	(0.0592)	(0.0842)	(0.0888)	(0.0711)	(0.0637)
$SBPI_{(t-1)}$	**0.8518*****	**0.7689*****	**0.8937*****	**0.8605*****	**0.4010****	**0.4481****	**0.3897****	**0.4767****
	(0.0872)	(0.0983)	(0.0845)	(0.0808)	(0.1616)	(0.1526)	(0.1821)	(0.1642)
FI	0.0004				**0.0033****			
	(0.0007)				(0.0016)			
FDI		0.0008				-0.0049		
		(0.0009)				(0.0052)		
INTFI			-0.0648				0.0914	
			(0.1309)				(0.0714)	
REGFI				-0.1694				**0.1218***
				(0.1805)				(0.0704)
CAR	-0.2286	0.1681	-0.2420	-0.1853	**1.0080***	**1.0120****	**1.1650****	**1.0130****
	(0.4375)	(0.3394)	(0.4136)	(0.3540)	(0.5190)	(0.3884)	(0.4819)	(0.4820)
OCA	**0.9306***	0.4121	0.8391	**0.9575****	**1.1920****	**1.1190****	**1.0740***	**1.1500****
	(0.5247)	(0.5835)	(0.5402)	(0.4726)	(0.4899)	(0.5291)	(0.6176)	(0.5189)
NPL	-0.5679	-0.6324	-0.4978	-0.4458	**-1.7470****	**-1.3520***	**-1.7900****	**-1.9590****
	(0.4438)	(0.4941)	(0.4362)	(0.3894)	(0.7323)	(0.8151)	(0.7882)	(0.7022)
LIQ	**-0.0425***	-0.0437	**-0.0410****	**-0.0408***	0.0431	0.0018	0.0281	0.01980
	(0.0233)	(0.0267)	(0.0197)	(0.0227)	(0.0796)	(0.0868)	(0.0849)	(0.0773)
DIV	0.0002	**0.0002***	0.0002	0.0002	**0.2235****	**0.1172***	**0.1596****	**0.1597****
	(0.0001)	(0.0001)	(0.0001)	(0.0001)	(0.0932)	(0.0648)	(0.0723)	(0.0694)
HHI	-0.0704	-0.0049	-0.0573	-0.0984	**-0.4177****	**-0.3742****	**-0.3193****	**-0.3387****
	(0.0875)	(0.0857)	(0.1021)	(0.0922)	(0.1444)	(0.1310)	(0.1440)	(0.1212)
MSH	-0.1223	**-0.1680***	-0.1067	-0.1057	**0.8565*****	**0.6266****	**0.7714****	**0.6203****
	(0.0886)	(0.0959)	(0.0754)	(0.0787)	(0.2567)	(0.2202)	(0.2521)	(0.2001)
FSD	-0.0010	**-0.0008***	-0.0005	-0.0007	0.0011	-0.0009	0.0014	0.0013
	(0.0006)	(0.0005)	(0.0006)	(0.0004)	(0.0014)	(0.0018)	(0.0019)	(0.0017)
GDP	0.0002	-4.08e-5	0.0002	0.0001	0.0023	-0.0018	-0.0006	-0.0003
	(0.0002)	(0.0002)	(0.0002)	(0.0002)	(0.0031)	(0.0016)	(0.0010)	(0.0010)
INFL	0.0007	-0.0006	0.0001	0.0005	0.0003	0.0022	0.0015	0.0020
	(0.0021)	(0.0031)	(0.0025)	(0.0022)	(0.0018)	(0.0014)	(0.0016)	(0.0014)
Diagnostics								
Wald χ^2	**1080.27*****	**1190.41*****	**1372.94*****	**1289.18*****	**315.67*****	**218.23*****	**218.00*****	**266.07*****
Obs.	294	289	294	294	445	449	451	451
Banks	53	53	53	53	72	75	75	75
Instruments	36	36	36	36	36	42	42	42
AR(1):	0.009	0.014	0.009	0.009	0.003	0.002	0.009	0.002
AR(2):	0.334	0.346	0.340	0.335	0.593	0.424	0.445	0.442
Hansen:	0.690	0.629	0.675	0.710	0.260	0.309	0.268	0.309

Notes: Robust standard errors are reported in parenthesis. *, **, *** implies statistical significance at 10%, 5%, and 1% respectively and coefficients in bold are statistically significant. The diagnostic tests reported are as in Table 6.

Table 3.5 (B): Financial integration and bank profitability: Sub-regional analysis using two-step system GMM (Continued)

SBPI	ECCAS				ECOWAS				SADC			
	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)	(a)	(b)	(c)	(d)
Constant	**0.3731***	**0.3018****	**0.2531***	**0.2838****	-0.0493	0.0707	0.0450	0.0707	-0.0527	0.0061	0.0149	0.0070
	(0.1602)	(0.1265)	(0.1342)	(0.1351)	(0.1034)	(0.1009)	(0.0993)	(0.0931)	(0.0918)	(0.0699)	(0.0685)	(0.0709)
$SBPI_{(t-1)}$	**0.4591*****	**0.4443*****	**0.4620*****	**0.4230*****	**0.2778***	**0.3106****	0.2538	0.2304	**0.5406*****	**0.5612*****	**0.5503*****	**0.5446*****
	(0.0816)	(0.0787)	(0.0938)	(0.0900)	(0.1570)	(.1546)	(0.1651)	(0.1679)	(0.1055)	(0.0906)	(0.1104)	(0.1003)
FI	0.0014				**0.0021****				0.0011			
	(0.0020)				(0.0007)				(0.0012)			
FDI		**0.0050****				**0.0019****				**-0.0020***		
		(0.0025)				(0.0009)				(0.0012)		
INTFI			**0.0899***				0.0498				-0.0144	
			(0.0530)				(0.0410)				(0.0484)	
REGFI				**0.1447****				0.0366				-0.0174
				(0.0701)				(0.0383)				(0.0252)
CAR	0.3139	0.0520	0.1060	0.0886	**1.1380****	**1.2230****	**1.1720****	**1.2050****	0.1568	0.1903	0.0924	0.1197
	(0.4864)	(0.4661)	(0.3429)	(0.4548)	(0.3774)	(0.4112)	(0.3784)	(0.4052)	(0.4033)	(0.3854)	(0.3977)	(0.3950)
OCA	0.6204	0.5441	0.6993	0.5228	**1.4680****	**1.4230*****	**1.4210****	**1.4680****	**1.9510*****	**1.771*****	**1.9210*****	**1.9570*****
	(0.6294)	(0.5561)	(0.5833)	(0.5549)	(0.4700)	(0.4471)	(0.4702)	(0.4884)	(0.4595)	(0.4214)	(0.4621)	(0.4281)
NPL	**1.244****	**1.270****	0.8146	**1.0960***	-0.8811	**-0.8942***	-0.7346	-0.8309	**-2.1890****	**-1.8290***	**-2.1640****	**-2.2000****
	(0.5467)	(0.5303)	(0.6299)	(0.6361)	(0.5951)	(0.5297)	(0.5655)	(0.5783)	(.9237)	(0.9395)	(1.0270)	(0.9412)
LIQ	-0.1021	**-0.1025***	**-0.1093***	-0.0827	0.0523	0.0316	0.0638	0.0637	0.0245	0.0311	0.0235	0.0246
	(0.0665)	(0.0602)	(0.0607)	(0.0547)	(0.0503)	(0.0465)	(0.0533)	(0.0519)	(0.0330)	(0.0303)	(0.0331)	(0.0325)
DIV	-0.0162	-0.0399	-0.0356	-0.0473	0.0950	0.0669	0.0749	0.0720	**0.0244****	**0.0204****	**0.0218****	**0.0220****
	(0.1214)	(0.1038)	(0.0825)	(0.1364)	(0.0763)	(0.0647)	(0.0729)	(0.0682)	(0.0115)	(0.0094)	(0.0010)	(0.0097)
HHI	0.0184	0.0664	0.0894	0.0302	-0.0421	-0.0901	-0.0697	-0.0936	0.0763	0.0814	0.0551	0.0552
	(0.0956)	(0.0813)	(0.0774)	(0.1026)	(0.0655)	(0.0739)	(0.0681)	(0.0774)	(0.0677)	(0.0559)	(0.0596)	(0.0602)
MSH	**-0.2960***	**-0.3253****	**-0.2946***	**-0.3061***	**0.3346*****	**0.2543****	**0.2893****	**0.2879****	**0.1896****	**0.1648****	**0.1664****	**0.1806****
	(0.1715)	(0.1593)	(0.1696)	(0.1730)	(0.1047)	(0.0933)	(0.1007)	(0.1041)	(0.0739)	(0.0623)	(0.0670)	(0.0659)
FSD	**-0.0057***	-0.0028	**-0.0045***	-0.0028	**-0.0025****	**-0.0021****	**-0.0024****	**-0.0021****	-0.0007	-0.0004	-0.0004	-0.0004
	(0.0031)	(0.0027)	(0.0026)	(0.0026)	(0.0008)	(0.0008)	(0.0008)	(0.0008)	(0.0005)	(0.0004)	(0.0004)	(0.0004)
GDP	0.0012	0.0019	0.0014	0.0019	0.0009	1.95e-5	0.0007	0.0007	**0.0064****	**0.0061****	**0.0059****	**0.0055****
	(0.0027)	(0.0024)	(0.0023)	(0.0025)	(0.0015)	(0.0014)	(0.0014)	(0.0014)	(0.0027)	(0.0028)	(0.0026)	(0.0028)
INFL	**0.0044***	**0.0056****	**0.0051****	**0.0055****	**0.0075*****	**0.0050****	**0.0069****	**0.0066****	0.0051	**0.0056***	**0.0066***	**0.0068****
	(0.0024)	(0.0024)	(0.0020)	(0.0023)	(0.0023)	(0.0021)	(0.0024)	(0.0024)	(0.0032)	(0.0032)	(0.0035)	(0.0032)
Diagnostics												
Wald χ^2	196.84***	213.31***	195.94***	223.37***	580.34***	587.87***	575.39***	602.84***	852.32***	1002.04***	776.89***	843.77***
Obs.	226	232	232	232	570	572	572	572	422	426	426	426
Banks	41	41	41	41	103	103	103	103	68	68	68	68
Instruments	33	33	33	33	36	36	36	36	50	50	50	50
AR(1):	0.003	0.004	0.004	0.004	0.001	0.001	0.003	(0.004	0.000	0.000	0.000	0.000
AR(2):	0.758	0.611	0.451	0.480	0.102	0.103	0.109	0.105	0.405	0.510	0.402	0.389
Hansen:	0.347	0.433	0.434	0.373	0.526	0.514	0.051	0.543	0.360	0.504	0.347	0.369

In ECOWAS, the results show that both financial freedom and FDI inflows to GDP have positive and significant effects on bank profitability at the 5% level. However, the results from the SADC community indicate that FDI inflows to GDP have a negative and statistically significant relationship with bank profitability. The two measures of cross-border bank participation were at best negative and insignificant while the measure of financial freedom was also positive but insignificant for SADC.

Results for the control variables show that greater capitalization has a significant positive effect on bank profitability in the EAC and ECOWAS communities. Also, operating cost is found to have a significant positive effect on overall bank profitability in the EAC, ECOWAS, and SADC sub-regions and when financial freedom index and regional bank assets are used as proxies for financial integration in the AMU. Operating cost has no significant effect on bank profitability in the ECCAS sub-region and no significant effect on profitability in AMU when FDI-to-GDP and foreign bank assets are used as proxies for financial integration. Non-performing loans (NPL) which proxies for credit risk has a significant negative effect on overall bank profitability in the EAC and SADC sub-regions and a negative but insignificant effect in the AMU banking sector. For ECOWAS sub-region, NPL ratio only has a significant effect on profitability when FDI-to-GDP is used as proxy for financial integration. However, contrary to the theoretical literature, the study finds a positive relationship between non-performing loans and overall bank profitability in the ECCAS sub-region. This could be explained by the macroeconomic and political volatility and experienced in this region which might be encouraging risky lending activities at high interest rates. Bank liquidity is significant and negatively related to profitability in AMU and ECCAS except when FDI-to-GDP is used as a proxy for financial integration in AMU and when financial freedom index and regional bank assets are used in ECCAS. This negative coefficient suggests that high liquidity reduces bank profitability in the affected sub-regional markets as it prevents banks from earning much from the liquid assets. The coefficient for diversification is significant and positive for the EAC and SADC banks. This implies that banks in these regions increase their profitability by exploring non-traditional sources of revenue. Competition proves to play a significant negative role in determining bank profitability in the EAC but has no significant effect on bank profitability in the other sub-regional markets. Market share has a significant positive relationship with bank profitability in the EAC, ECOWAS and SADC markets, but negative and significant in ECCAS and in the AMU when FDI-to-GDP is used to proxy financial integration.

Moving to the effect of the macroeconomic controls, the study finds a strong inverse relationship between banking sector development and bank profitability in ECOWAS. Similar results are found when FDI-to-GDP

is used as a proxy for financial integration in AMU and when financial freedom and foreign bank assets are used in the ECCAS sub-region. The coefficients of GDP growth also show that a positive and significant relationship exist between real sector growth and bank profitability in the SADC region while inflation plays a significant positive role in the ECCAS, ECOWAS and SADC banking markets.

3.5 Conclusions

Over the past three decades, African countries have implemented several regulatory and structural reforms to promote the harmonization and integration of their financial sectors and facilitate the performance and ability of financial intermediaries to promote distributive efficiency and greater socio-economic development. Against this background, this chapter examines the level and determinants of overall bank profitability in Africa's banking sector and compares the results across five regional economic communities, which form the bedrocks of Africa's integration drive. The chapter employs both fixed effects and the two-step system GMM estimation techniques on bank and country level data for 47 African countries covering the 2007 to 2014 period.

The empirical investigation reveals that increased financial integration has a significantly positive effect on the overall profitability of banks in Africa. More specifically, the study finds that financial freedom, international and regional cross-border banking activities in Africa significantly increase bank profitability across Africa. The findings are in line with a recent study by Luo et al. (2017) for the Chinese banking industry. However, a recent study by Ghosh (2016) which included banks from 45 African countries found a negative effect of financial integration on bank profitability for the 169 countries studied. A possible explanation could be that, given that Africa's banking markets are not perfectly competitive, the liberalization of financial markets and the competitive pressure help improve their efficiency and force them to seek out new clients to stay profitable. Moreover, an underdeveloped equity and credit market system allows African banks to explore diversification benefits to improve upon their profitability. However, a comparison of the results across five regional economic communities of Africa reveals that these benefits are not enjoyed by banks in all sub-regional markets. The study finds that financial integration in the AMU sub-regional market has no significant effect on bank profitability, reflecting both the regions low level of financial freedom and cross-border banking activities shown in Chapter Two. Also, the findings show that higher operational cost in increasingly integrated financial markets could adversely affect bank ROA but increase their overall profitability. These findings suggest that the adverse competitive effects of deeper financial

integration on bank ROA could be averted by banks' willingness to increase their operational cost through investments in product innovation and diversification, credit collection methods and customer mobilization activities. . However, an inter-REC comparison of the results shows major variations in the effects of financial integration and other factors on bank profitability across Africa's sub-regional markets. This proofs the disproportionate levels of financial integration in the RECs of Africa and reflects the challenges faced by policy makers in their effort to ensure the overall integration of the region's financial markets. In the EAC, where competition plays a major role in determining bank profitability, the ability of a bank to diversify its revenue sources also proves to be significant and critical for a bank's profitability. Also, banks in Africa tend to benefit significantly from the high inflation regimes in most African countries. However, at the sub-regional level, the effect of inflation on bank profitability is predominantly negative.

From a development finance perspective, the study findings support the view that continuous financial integration in Africa is beneficial for the overall profitability of banks and the general economy. However, the discrepancies in the results across the five sub-regional markets suggests that wholesale integration policies will not auger well for Africa unless they are tailored to fit the settings of the various sub-regional banking markets. Specifically, policy makers, regulators and bank managers should work hand in hand to promote regional cross-border activities as this significantly enhances bank profitability in the full sample, EAC and ECCAS regions. Also, the level of FDI inflows in Africa should be boosted if its benefits for banks and the general economy are to be enjoyed. This is especially important in the ECCAS and ECOWAS banking sectors since FDI net inflows is found to significantly improve bank profitability in these markets. In the SADC banking sector, governments should take steps to curb the negative effects of FDI inflows on the domestic banking sector. Our findings also support the continuous pursuit of financial freedom and other liberalization policies in Africa, especially in the EAC and ECOWAS sub-regions as this broadly improves bank profitability. We conclude that the positive effect of inflation on bank profitability in the full sample does not imply that governments in Africa should allow inflation rates to rise. This is because at the sub-regional level, except for ECCAS, the relationship is largely negative. Besides, most prior studies find a direct positive relation between high inflation rates and high credit default, which reduces bank profits. From a policy perspective, regulatory authorities in Africa should take steps to curb inflation rate growth while adopting policies to reduce credit risk such as the establishment of credit monitoring systems to reduce information asymmetries and the negative repercussions of high loan defaults on bank profitability. Finally, the positive effect of GDP growth on bank profitability implies that African countries need to continually improve the growth performance of their various economies as this enhances bank profitability.

References

African Development Bank. (2010). Financial sector integration in three regions of Africa: How regional financial integration can support growth, development and poverty reduction. Technical Report. Cote D'Ivoire, 1-142.

Agenor, P. R. (2003). Benefits and costs of international financial integration: Theory and facts. *The World Economy*, 26(8), 1089-1118.

Amidu, M. and Wilson, J.O.S. (2014). Competition in African banking: Do globalization and institutional quality matter?"". *Working Paper in Responsible Banking and Finance*, WP Nº 14-004, 2nd Quarter 2014.

Andries, A.M. and Capraru, B. (2013). Impact of financial liberalization on banking sectors performance from central and eastern European countries, *PLoS One,* 8(3), 1-9.

Aoki, K. and Nikolov, K. (2015). Bubbles, banks and financial stability. *Journal of Monetary Economics*, 74(C), 33-51.

Arellano, M. and Bond, S. (1991). Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. *The Review of Economic Studies*, 58, 277- 297.

Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68, 29–52.

Bain, J.S. (1951). Relation of profit ratio to industry concentration: American manufacturing 1936- 1940. *Quarterly Journal of Economics*, 65(3), 293-324.

Beck, T., Fuch, M. and Singer, D. and Witte, M. (2014). Making cross-border banking work for Africa. The World Bank *Technical Report No. 89202.* Published by: Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH. Eschborn, Germany.

Blundell, R. and Bond, S. (1998). Initial conditions and moment restrictions in dynamic panel data models. *Journal of Economics*, 87(1), 115–143.

Cetorelli, N. and Goldberg, L.S. (2011). Global banks and international shock transmission: Evidence from the crisis. *IMF Economic Review*, 59(1), 41-76.

Chelo, M. and Manlagnit, M.C.V. (2011). The economic effects of foreign bank presence: Evidence from the Philippines. *Journal of International Money and Finance*, 30(6), 1180-1194.

Čihák, M., Demirgüç-Kunt, A., Feyen, E. and R. Levine. (2012). Benchmarking financial systems around the world. *World Bank Policy Research Working Paper* No. 6175. The World Bank, Washington DC, USA.

Claessens, S., Demirguc-Kunt, A. and Huizinga, H. (2001). How Does Foreign Entry Affect Domestic Banking Markets? *Journal of Banking and Finance*, 25, 891 – 911.

Claessens, S. and van Horen. N. (2014). Foreign banks: trends and impact. *Journal of Money Credit Banks*, 46(1), 295-326.

Dell'Ariccia, G., Detragiache, E. and R. Rajan. (2008). The real effects of banking crisis. *Journal of Financial Intermediation*, 17, 89-112.

Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Law and Economics*, 16, 1–9.

Detragiache, E., Tressel, T. and Gupta, P. (2008). Foreign banks in poor countries: theory and evidence. *Journal of Finance*, 63(5), 2123–2160.

Dietrich, A. and Wanzenried, G. (2011). Determinants of bank profitability before and during the Crisis: Evidence from Switzerland. *Journal of International Financial Markets, Institutions and Money*, 21(3), 307-327.

Fiordelisi, F., Marquez-Ibanez, D. and Molyneux, P. (2011). Efficiency and risk in European banking. *Journal of Banking and Finance*, 35(5), 1315-1326

Flamini, V., McDonald, C. and Schumacher, L. (2009). The determinants of commercial bank profitability in Sub-Saharan Africa. *IMF Working Paper* No. WP/09/15. Washington DC.

Francis, M. E. (2013). Determinants of commercial bank profitability in Sub-Saharan Africa. *International Journal of Economics and Finance*, 5(9), 134-147.

Gamariel, G. (2015). Financial liberalization policies and bank profitability in Sub Saharan Africa. International *Journal of Research in Business Studies and Management*, 2(10), 1-14.

Garcia, M.T.M. and Guerreiro, J.P.S.M. (2016). Internal and external determinants of banks' profitability. *Journal of Economic Studies*, 43(1), 90-107.

Ghosh, A. (2016). Banking sector globalization and bank performance: A comparative analysis of low income countries with emerging markets and advanced economies. *Review of Development Finance*, 6(2016), 58-70.

Giannetti, M. and Ongena, S. (2009). Financial integration and firm performance: Evidence from foreign bank entry in emerging markets. *Review of Finance*, 13, 181-223.

Kennedy, P. (2008). A guide to econometrics. (6th edition). *Malden*, MA: Blackwell.

Kose, A. M., Prasad, E., Rogoff, K. and Wei, S. J. (2009). Financial globalization: a reappraisal. *IMF Staff Papers*, 56, 8–62.

Lane, P.R. (2012). The European sovereign debt crisis. *Journal of Economic Perspectives*, 26(3), 49-68.

Leon, F. (2016). Does the expansion of regional cross-border banks affect competition in Africa? Indirect evidence. *Research in International Business and Finance*, 37 (2016), 66-77

Luo, D., Dong, Y., Armitage, S. and Huo, W. (2017). The impact of foreign bank penetration on domestic banking sector: evidence from China. *The European Journal of Finance*, 23(7-9), 752-780.

Maechler, A.M. and McDill, K.M. (2003). Dynamic depositor discipline in U.S. banks. IMF Working Paper No. WP/03/226. International Monetary Fund, Washington DC.

Masood, O. and Ashraf, M. (2012). Bank-specific and macroeconomic profitability determinants of Islamic banks: The case of different countries. *Qualitative Research in Financial Markets*, 4(2/3), 255-268.

McKinnon, R. (1973). Money and capital in economic development. *The Brookings Institution*, Washington DC.

Mishkin, F.S. (2007). Is financial globalization beneficial? *Journal of Money, Credit and Banking*, 39, 259–294.

Mishkin, F.S. (2009). Why we shouldn't turn our backs on financial globalization. *IMF Staff Papers*, 56(1), 139-170.

Moyo, J., Nandwa, B., Oduor, J. and Simpasa, A. (2014). Financial sector reforms, competition and banking system stability in Sub-Saharan Africa. Paper presented at the joint RES-SPR *Conference on "Macroeconomic Challenges Facing Low-Income Countries*". International Monetary Fund, Washington, DC—January 30–31, 2014.

Peria, M.S.M. and Mody, A. (2004). How foreign participation and market concentration impact bank spreads: Evidence from Latin America. *Journal of Money, Credit and Banking*, 36(3), 511- 537.

Pohl, B. (2011). Spillover and competition effects: Evidence from the Sub-Saharan African banking sector. German Institute of Global and Area Studies Research Programme: Socio-Economic Challenges in the Context of Globalisation, *GIGA Workig Paper No. WP*/165/2011

Pradhan, R.U., Arvin, M.B., Hall, J.H. and Bahmani. S. (2014). Causal nexus between economic growth, banking sector development, stock market development, and other macroeconomic variables: The case of ASEAN countries. *Review of Financial Economics*, 23, 155–173.

Quinn, D.P., Schindler, M. and Yoyoda, A.M. (2011). Assessing measures of financial openness and integration. *IMF Economic Review*, 59, 488-522.

Roodman, D. (2009). A note on the theme of too many instruments. *Oxford Bulletin of Economics and Statistics*, 7(1), 135–158.

Schumpeter, J.A. (1911). The theory of economic development; an inquiry into profits, capital, credit, interest, and the business cycle. Translated by Opie, R. *Harvard University Press*, Cambridge.

Shaw, E.S. (1973). Financial deepening in economic development. *Oxford University Press*, New York.

Shen, C. H., Lu, C. H. and Wu, M. W. (2009). Impact of foreign bank entry on the performance of Chinese banks. *China and World Economy*, 17(3), 102–121.

Shih, V., Zhang, Q. and Liu, M. (2007). Comparing the performance of Chinese banks: a principal component approach. *China Economic Review*, 18(1), 15–34.

Silva, G.J.C. and Pirtouscheg, L.A.S. (2015). Basic interest rate, bank competition and bank spread in personal credit operations in Brazil: A theoretical and empirical analysis. *Economia*, 16, 32–45.

Sissy, A.M., Amidu, M. and Abor, J.Y. (2017). The effects of revenue diversification and cross border banking on risk and return of banks in Africa. *Research in International Business and Finance*, 40, 1–18.

Stigler, A. (1964). A theory of oligopoly. *Journal of Political Economy*, 72, 44-61.

Tan, A. Y. and Floros, C. (2012). Bank profitability and inflation: The case of China. *Journal of Economic Studies*, 39(6), 675-696.

Tan, Y. (2016). The impact of risk and competition on bank profitability in China. *Journal of International Financial Markets, Institutions, and Money*, 40, 85-110.

Weill, L. (2013). Bank competition in the EU: How has it evolved? *Journal of International Financial Markets, Institutions and Money*, 26(C), 100-112.

Windmeijer, F. (2005). A finite sample correction for the variance of linear efficient two-step GMM estimators. *Journal of Econometrics*, 126, 25–51.

World Bank (2007). Financial sector integration in two regions of Sub-Saharan Africa. January 2007, Washington DC.

Appendix

Appendix 3A: Variables description

Dependent Variables	Description	Source
SBPI	Standardized bank profitability Index constructed using principal components analysis	Bankscope data
ROA	Net income/Total assets	√
ROE	Net income/Total equity	√
NIM	(Interest income-interest expense)/Earning assets	√
Independent variables		
Capital adequacy ratio (CAR)	Total equity/Total assets	√
Credit risk (NPL)	Non-performing loans/Total loans	√
Cost efficiency (OCA)	Non-interest expense/Total operating income	√
Liquidity risk (LIQ)	Liquid assets/Total deposits	√
Diversification (DIV)	Noninterest income /Total operating income	√
Competition (HHI)	HHI of gross loans	√
Market share (MSH)	Loans of bank i/Total loans of the banking sector in country j	√
Financial sector development (FSD)	Bank branches per 1000 adults	WDI, World Bank
Economic growth (GDP)	Annual real GDP growth rates	WDI, World Bank
Inflation Rates (INFL)	Consumer price index	WDI, World Bank
International financial integration		
Financial freedom index (FI)	Degree of freedom of financial markets and institutions from government control	Heritage Foundation (2016)
Net inflow of FDI to GDP (DFI)	Net Inflows of FDI as a percentage of GDP	WDI, World Bank
Foreign banks deposits (INTERFI)	Total deposits in all foreign banks in country j/ Total bank deposits in country j	Bankscope Data
Regional financial integration (REGFI**)**	Total deposits in all regional banks in country j/ Total bank deposits in country j	√

CHAPTER FOUR

FINANCIAL INTEGRATION, COMPETITION AND BANK RISK-TAKING BEHAVIOR: EVIDENCE FROM AFRICA'S SUB-REGIONAL MARKETS

4.1 Introduction

Risk is inherent in banking business and the effect of financial integration and competition changes on banking stability has been a central issue in the active debate among academics, practitioners and policy makers in the financial services industry. This debate is even more critical for emerging economies due to the high prevalence of information asymmetry in their largely underdeveloped and bank-dominated financial systems (Bourgain et al., 2012). Besides, excessive bank risk-taking does not only pose a threat to individual bank profitability and survival, but also imperils the stability and productivity of the economy (Rose, 2011; Schoemaker, 2011).[19] Therefore, since the recent global financial crisis, the debate has largely centered on the role played by financial integration in the crisis and how future occurrences could be averted.

Generally, banking supervision is guided by the fundamental principle that factors which distort bank market structure pose a threat to banking stability through influences on the risk-taking conduct of individual banks (Marcus, 1984; Keeley, 1990). In view of this, financial integration, which facilitates the mobility of capital and financial intermediaries across national borders, has been identified by the extant literature as a key factor that imperils the stability of banks (Keeley, 1990; Farroukh, 2013; Cabillas and González, 2014). However, the empirical evidence on the relationship between financial integration and bank fragility has failed to arrive at a unanimous conclusion and can be described as contentious at best.

Largely heralded as a vital catalyst for enhancing economic growth, financial integration has been embraced by most African countries and other developing economies as a panacea to their capital accumulation, allocation and other development challenges (Beck and Cull, 2014). This saw the adoption of major regulatory reforms in favor of financial integration in most African countries since the mid-1980s. However, despite these and other acclaimed benefits, Africa's financial integration has the potential to erode the charter value of individual banks and reduce their ability to charge monopoly rents (Keeley,

[19] The recent global financial crisis, which ostensibly originated from unbridled risk-taking behavior of key financial intermediaries, provides evidence in support of this view (Rose, 2011; Schaeck and Cihák, 2014).

1990). Affected banks may react by either adopting innovative and efficient banking practices (Boyd and de Nicolò, 2005; Berger et al., 2009) or engaging in risky conduct (Keeley, 1990; Rupello, 2004) to maintain their profit profiles (Fiordelisi and Mare, 2014). A third strand of the literature suggest that the relationship is non-linear (Martinez-Mierra and Repullo, 2010; Jiménez et al, 2013). Growing tensions in the empirical literature after the GFC, makes it crucial for regulators and policy makers in economic blocs seeking greater financial integration to empirically examine the role played by financial integration and resulting bank competition changes in determining the risk-taking behavior of banks and financial stability overtime.

In this chapter, the study analyzes the effects of financial integration and competition changes on bank risk-taking behavior using a panel dataset from 47 African countries and compare the results across five regional economic communities, since these relationships reflect changes in bank competitive conduct in response to market structure changes resulting from increased financial freedom and cross-border banking in Africa (Farroukh, 2013). To the best of the researcher's knowledge, the empirical literature on Africa have failed to adequately interrogate the role played by financial integration in shaping bank risk-taking behavior in Africa nor has any attempt been made to distinguish between its direct effect and the indirect effect that occurs through the channel of bank competition. The study is therefore necessitated by the lack of consensus in the literature (Keeley, 1990; Boyd and de Nicolo, 2005; Beck et al., 2006; Martinez-Mierra and Repullo, 2010; Jiménez et al., 2013; Goetz, 2018; Norman et al., 2018) as well as the paucity of literature on the effect of Africa's progressive financial integration on the banking stability (Moyo et al, 2014)[20]. The study therefore employs the fixed and random effects models[21] on an unbalanced panel of 405 banks from the 47 African economies to test the effect of financial freedom and bank competition on bank risk-taking behavior across Africa and the five sub-regions. Second, the chapter examines whether variations in financial freedom and its interaction with variations in bank market structure reduces bank risk-taking behavior in Africa. The chapter further tests the Martinez-Mierra and Repullo (MMR) (2010) theory of a U-shaped relationship between competition and bank risk-taking behavior. The Chapter further examines the role of quality institutions in shaping bank risk-taking conduct. Lastly, these relationships are compared across five regional economic communities of Africa amid an array of controls.

[20] For instance, though some studies examine the nexus between competition and bank fragility in Africa (Amidu and Wolfe, 2013; Brei, et al., 2018), very few have looked at the link between financial integration and bank risk-taking behavior (Motelle and Bikpe, 2014; Moyo et al., 2014; Sissy et al., 2017). Largely, these studies failed to examine the trilemma between deeper financial integration, bank competition and bank stability in Africa.

[21] Discussion is based on the Hausman specification test results. See Section 4.3.1 for further explanation.

The chapter contributes to the literature on bank risk-taking is several ways. First, the study provides new empirical evidence on the nexus between financial integration, competition changes and bank risk-taking behavior in Africa, especially for five clusters of financial integration projects (RECs) in the region. To the best of the researcher's knowledge, this is the first study to conduct a comprehensive sub-regional comparison of these relationships. Second, the chapter provides support for the stabilizing role of financial integration in banking markets through the competition channel. The findings support the view that in competitive banking markets, increased financial freedom and cross-border participation drives banks towards greater stability. The chapter also provides evidence of the Martinez-Mierra and Repullo (2010) theory of a quadratic effect of competition on bank risk-taking behavior. Additionally, this chapter provides evidence of the role of control of corruption and regulatory quality in shaping bank risk-taking conduct in emerging economies. The comparison of these relationships across Africa's regional economic communities is expected to enhance policy and managerial decision making and ensure an optimal resolution of the trilemma between promoting greater financial integration and bank competition without increasing bank and economic instability.

The rest of the chapter is organized as follows: Section 4.2 discusses the pertinent literature. Section 4.3 describes the research methodology while Section 4.4 presents and discusses the empirical results. Section 4.5 concludes the chapter.

4.2 Literature review

The study is motivated by the ongoing contentions in the literature about the effects of financial integration on bank stability, coupled with the paucity of literature on the effects Africa's integration process. Largely, the literature[22] on the effect of financial integration on bank risk-taking behavior pivots around its underlying effects on the nexus between competition and stability. The 'franchise-value' paradigm contends that by stimulating higher competition among banks, financial integration promotes bank risk-taking behavior (Marcus, 1984). This 'competition-fragility' view suggests that financial freedom promotes foreign and domestic participation, which contracts bank charter values, clogs their ability to charge monopoly rents and forces them to engage in risky activities to maintain their profit profiles. In contrast, the 'competition-

[22] See Cubillas and Gonzalez (2014) and Hamdaoui, Zouari and Maktouf (2016) for more comprehensive reviews of studies on financial integration and bank stability.

stability' theory contends that instead of increasing bank fragility, such competitive pressure rather promotes greater stability by pushing banks to become more innovative and efficient. Indeed, Boyd and de Nicolò (2005) demonstrated that in periods of rising competitive pressure, banks employ cost-leadership and differentiation strategies to gain greater market shares for profits without sacrificing their stability (Lui et al., 2012). Besides, lower intermediation spreads reduce bank default risks (Beck, et al., 2006). A third strand of the literature contends that the relationship is not linear as the earlier theories suggest but U-shaped (Caminal and Matutes, 2002). According to Martínez-Miera and Repullo (MMR) (2010), as competition increases, banks enhance their efficiency and reduce their risk profiles up to an optimum threshold, beyond which additional increases in competition leads to increases in risk-taking.

Empirical studies examining the determinants of bank-risk-taking behavior are also rife with disagreements. While the following studies among others all support the franchise-value theory: Agoraki et al. (2011) for 546 banks from 13 Central and Eastern European economies; Beck et al. (2013) for a cross-country sample of 17,055 banks from 79 countries; Tabak et al. (2015) for the Brazilian banking sector; Soedarmono and Tarazi (2016) for 686 banks from 12 Asia-Pacific countries from 1994 to 2009; Shijaku (2017) for 16 Albanian banks for the 2008-2015 period; and Kabir and Worthington (2017) for banks from 16 developing economies over the 2000-2012 period. Others such as Turk-Ariss (2010) for 821 banks from 60 developing countries for the period 1999-2005; Fu et al. (2014) for 14 Asia-Pacific economies for the period 2003-2010; Schaeck and Čihák (2014) for 3,325 European banks for the 1995-2005 period; Kasman and Kasman (2015) for Turkish banking industry for the 2002-2012 period; and Goetz (2018) for the United States banking sector: all provide evidence in support of the "competition-stability" view. Also, in support of the MMR theory, Berger et al. (2009) for 23 developing countries; Tabak et al. (2012) for 10 countries from 2003 to 2008; Jiménez et al. (2013) for 107 commercial and savings Banks in the Spanish banking sector and Brei, Jacolin and Noah (2018) for 221 banks in 33 Sub-Saharan African countries from 2000 to 2015, all found a U-shaped or non-linear relationship between competition and bank risk-taking behavior.

Studies focusing on the role of financial integration in shaping bank risk-taking behavior are saddled with similar contentions. For instance, while Rossi (1999) and Joyce (2011) among others supports a negative relationship between financial integration and bank risk-taking behavior. Others such as Bourgain et al. (2012), Cubillas and Gonzalez (2014), Smaga (2014) and Li and Su (2016) all insist the relationship is positive and that deeper financial integration promotes bank risk-taking. However, based on evidence from a sample of 49 countries from 1980 to 2010, Hamdaoui et al. (2016) propose that the relationship between financial integration and bank fragility is an inverted U-shaped. These studies however failed to account for

the channels through which financial integration determines bank risk-taking behavior, limiting the practical application of their findings. To remedy the above shortcoming, several recent studies have examined the competition and other channels through which financial integration affects bank risk-taking behavior. For instance, Cubillas and González (2014) empirically examined the stability effect of financial integration through the competition channel using data from 4,333 banks from 83 developed and developing countries for 1991-2007. They found that though the full sample results confirmed the competition-fragility view, the effect through the competition channel are only significant in developed countries while deeper financial integration in developing countries affected bank fragility through the creation of so called opportunities for greater risk-taking. Also, Farroukh (2013) found that financial integration and bank competition changes positively influence bank risk-taking behavior in 13 MENA countries for 1980–2009. However, after studying 180 Southeast Asian banks for the period 1990-2014, Norman et al. (2018) contend that bank regulation serves as a moderating factor to reduce bank risk-taking despite rising competition in the banking system.

Studies on the effect of Africa's financial integration have also largely failed to empirically test the effect of financial integration on bank fragility through the channel of bank competition. For instance, prior studies on the effects of financial integration on the banking sector of Africa by World bank (2007), African Development Bank (2010), Motelle and Biekpe (2014), Moyo et al. (2014), Leon (2016) and Sissy et al. (2017) all failed to distinguish between its direct and indirect effects on bank risk-taking behavior and to account for the moderating role played by integration in shaping the competition-fragility nexus of banking in Africa. Specifically, the evidence on the interactive effects of financial integration and bank competition changes in determining bank risk-taking conduct in Africa seems non-existent. There also seem to be no single recent study explaining the sub-regional disparities in the effect of financial integration on the bank competition-fragility nexus in Africa.

In sum, while financial integration may generate positive effects on the competitiveness and efficiency of banks in emerging markets through lower intermediation cost, innovation and efficiency, its effects on bank stability are not always desirable. The scanty empirical studies on the effect of Africa's financial integration process, amid the ongoing tensions in the theoretical and empirical literature therefore highlights the urgent need for this study. These relationships are tested amidst an array of controls. This is expected to guide policy decisions and actions and promote peer-learning among Africa's RECs.

4.3 Methodology

4.3.1 Empirical specification

To examine the effect of financial integration and competition on bank risk-taking behavior, the study estimates the following model following the work of Agoraki, et al (2011) and Farroukh (2013):

$$R_{it} = \alpha + \beta_1 FI_{jt} + \beta_2 L_{it} + \beta_3 (L_{it})^2 + \sum_{k=1}^{n} \gamma_k X_{it} + \sum_{l=1}^{m} \phi_l M_{jt} + \lambda_i + \varepsilon_{ijt} \quad (7)$$

where $R_{i,t}$ denotes bank *i*'s risk-taking behavior at time *t*. The study interchangeably proxies this using bank z-score and non-performing loans ratio; *j,* indexes country; FI_{jt} is the proxy for financial integration while L_{it} denotes bank market structure, proxied by the Lerner index. In line with Martinez-Mierra and Repullo (2010), Fu et al (2014) and Norman et al. (2018), the study includes a quadratic term of the Lerner index $(L_{it})^2$ to capture the possible nonlinear effect of bank market structure on risk-taking conduct: α, β, γ, φ, θ are estimated parameters while $X_{i,t}$ and $M_{j,t}$ are vectors of bank and country level controls respectively. λ represents unobserved individual bank effects while ε_{iit} is the idiosyncratic error term. The descriptive statistics of these variables are presented in Table 4.1.

In line with Agoraki, et al. (2011), Farroukh (2013) and Norman et al. (2018), the study includes a multiplicative interaction term of financial freedom and Lerner index to account for the effect of financial integration on bank risk-taking behavior through the competition channel. According to Brambor et al. (2006), failure to account for such an interactive effect may limit the practical application of research findings. The study therefore extends the basic model in Equation 7 to include the interaction term as follows:

$$R_{i,t} = \alpha + \beta_1 FI_{j,t} + \beta_2 L_{i,t} + \beta_3 \left(L_{i,t}\right)^2 + \beta_4 (FI_{j,t} * L_{i,t}) + \sum_{k=1}^{n} \gamma_k X_{i,t} + \sum_{l=1}^{m} \phi_l M_{j,t} + \lambda_i + \varepsilon_{ij,t} \quad (8)$$

where all variables are as defined in Equation 1 except the multiplicative interaction term $FI_{jt} * L_{it}$.

Following the extant literature[23], Equations 7 and 8 are estimated using static panel models. Farroukh (2013) argue that using the fixed effects model helps account for time and country fixed effects on the risk-taking conduct of banks. However, since this is a comparative study and the Hausman specification test failed to choose one specification for all samples, the study includes results for both fixed and random

[23] See Agoraki, et al. (2011); Farroukh (2013 among others.

effects models in its analysis. However, the discussion is based on the results of the model chosen by the Hausman test unless otherwise stated. The interpretation of the findings follows the works of Brambor et al. (2006), Farroukh (2013) and Norman et al (2018).

The chapter concentrates on the coefficients β_1, β_2 and β_3 for evidence of the effects of financial integration, bank competition and the quadratic form of bank competition on bank risk-taking behavior respectively. The coefficient of the multiplicative interaction term (β_4) provides evidence of the effect of financial integration in a competitive banking system (Norman et al., 2018). For instance, since the z-score measures distance from insolvency and higher values denote greater stability, positive and significant values of β_1 and β_2 in either Equation 7 or 8 implies that financial integration and bank competition, respectively promotes bank stability and vice versa. However, if the dependent variable is the NPL ratio, since higher NPL ratio implies higher bank risk-taking behavior, positive and significant values of β_1 and β_2 will be evidence of a negative effect of financial integration and competition on bank stability. In equation 8, a positive and significant value of β_4 provides evidence that financial integration promotes bank stability in a competitive banking environment and the vice versa is true for the NPL ratio. Also, in both Equations 7 and 8, a negative and significant value of β_3 when β_2 is positive indicates that the relationship between bank competition and risk-taking is an inverted U and vice versa**.**

4.3.2 Measuring bank risk-taking behavior

Following the extant literature[24], the chapter employs two widely used proxies of bank risk-taking behavior in the empirical analysis. First, the study uses Z-score as the primary proxy of bank insolvency risk since it measures the number of standard deviations a bank's return on assets must fall below its estimated mean value before the bank's equity is depleted (Norman et al., 2018). Following Soedarmono et al. (2013), a bank's z-score is computed as follows:

$$Z_{i,t} = \frac{ROA_{i,j,t}+EQTA_{i,j,t}}{\delta ROA_{i,j,t}} \quad (9)$$

where $Z_{i,t}$ is bank i's insolvency risk at time t and higher Z-score values imply lower insolvency risk or greater bank stability and vice versa.; $EQTA_{ijt}$ represents a banks capitalization measured as the ratio of total equity to total assets; ROA_{ijt} is bank return on assets; $\delta ROAi_{,t}$ is the standard deviation of a bank's

[24] See Jiménez et al. (2013), Amidu and Wolfe (2013); Goetz (2018) and Norman et al. (2018) among others.

return on assets. To normalize the distribution and allow for more optimal estimations, the study follows the work of Norman et al. (2018) among others, to use the natural logarithm of the computed z-scores for the empirical analysis.

Additionally, the study uses the log-odds transformation of a bank's nonperforming loans ratio (NPLR) measured as the ratio of total impaired loans to gross loans to proxy for bank intermediation risk. This measures the quality of loans and reveals a bank's propensity to lend to subprime or risky borrowers (Goetz, 2018). NPLR is mathematically defined as:

$$NPLR_{i,t} = ln\left(\frac{NPL\ ratio_{i,t}}{1-NPL\ ratio_{i,t}}\right) \tag{10}$$

where NPLR is the log odds transformation of the NPL ratio of bank i in year t and higher value means higher bank credit risk and vice versa.

4.3.3 Measuring bank competition

To measure competition, the study follows the work of Amidu and Wolfe (2013) to estimate bank market power using Lerner Index. The Lerner index measures a bank's market power by calculating its markup of prices over marginal cost (Berger et al., 2009) as follows:

$$L_{it} = \frac{(AR_{it} - MC_{it})}{AR_{it}}, \tag{11}$$

where L_{it} is bank i's Lerner index in year t; AR_{it} and MC_{it} are average revenue and marginal cost respectively. Average revenue measures the price of total assets, derived as total revenue/total assets while the marginal cost is the percentage change in total cost resulting from producing one more unit of output. Following Cubillas and González (2014), the study estimates the following transcendental logarithmic cost function to derive marginal cost, $MC_{i,t}$:

$$\begin{aligned}\ln(Cost_{it}) = {} & \beta_0 + \beta_1 \ln(Y_{it}) + \frac{1}{2}\beta_2 \ln {Y_{it}}^2 + \sum_{k=1}^{3} \delta_k \ln W_{k,it} + \sum_{k=1}^{3} \frac{1}{2}\delta_4 \ln {W_{k,it}}^2 + \sum_{k=1}^{3} \delta_{ki} \ln y_{it} \ln w_{k,it} \\ & + \sum_{k=1}^{3}\sum_{j=1}^{3} \delta_{kj} \ln(W_{k,it}) \ln(W_{j,it}) + \phi_1 \ln Z_{it} + \frac{1}{2}\phi_3 \ln {Z_{it}}^2 + \phi_2 \ln Y_{it} \ln Z_{it} \\ & + \sum_{k=1}^{3} \phi_{ki} \ln W_{k,it} \ln Z_{it} + \varsigma \mathrm{T} + \varepsilon_j \end{aligned} \tag{12}$$

The above specification assumes that bank i's total costs in year t is a function of one standard bank output Y_{it} and three input prices W_1, W_2 and W_3 respectively. In line with Amidu and Wolfe (2013) and Cubillas and González (2014), the study proxies bank output by total assets and includes prices of labor, funding and fixed capital as input prices for labor, capital and fixed assets respectively. T represents the deterministic time trend, capturing general time-related changes in technology (Berger et al., 2009). Also, following Coccorese (2014), the study includes equity capital (Z_{it}) as an additional control to account for the probability that capital is employed as a source of funding by a bank (Hughes and Mester, 1993; Coccorese 2014). Also, in line with the empirical literature, the study divides all factor prices and total operating cost by the price of deposits to impose homogeneity of degree one in the input prices (Coccorese, 2014). Marginal cost (MC_{ijt}) is then estimated using the first derivative of the translog cost function with respect to output as follows:

$$\mathrm{MC_{i,t}} = \frac{cost_{i,t}}{y_{i,t}}\left[\beta_1 + \beta_2 \ln y_{i,t} + \sum_{k=1}^{2} \lambda_k \ln W_{k,i,t} + \phi_2 \ln\left(Z_{i,t}\right)\right] \qquad (13)$$

The value of the Lerner index is interpreted as the market power of each bank in each year, with higher values denoting higher pricing power and lower competitive market conditions (Amidu and Wolfe, 2013).

Financial integration is measured using country level estimates of the degree of financial freedom from the Heritage Foundation Economic Freedom database (2015). The financial freedom index measures a country's degree of financial openness, accounting for freedom of participation by both foreign and local banks and the level of freedom financial markets and institutions have from government control. Therefore, higher values of the index indicate greater financial freedom and *vice versa*. In line with the competition-stability literature, the study conjectures that financial freedom significantly increases bank stability if the banking sector is competitive.

To isolate the impact of financial integration and competition changes on bank risk-taking behavior, the study introduces a set of bank and macroeconomic controls based on the literature. Bank level controls include management quality, bank size, capitalization, loan ratio, loan quality, and revenue diversification. First, management quality, measured as total operation cost-to-income ratio, is expected to positively correlate with bank risk-taking as higher values denote lower cost efficiency and vice versa (Fiordelisi and Mare, 2014; Schaeck and Cihák, 2014). Bank size, measured as the natural logarithm of total assets, has no unanimously agreed effect of bank risk-taking behavior (Tabak et al., 2012). However, size in Africa's

embryonic banking systems is expected to negatively affect bank risk-taking due to the relatively small sizes of banks in the region, which hardly enjoy the 'too big to fail' condition to warrant unchecked risk-taking behavior. Besides, in nascent markets, larger banks are better able to diversify their asset portfolios to curtail risk compared to smaller banks (Norman et al., 2018). The ratio of total equity to total assets is used to proxy bank capitalization and it is expected to improve bank stability by cushioning banks against the effects of losses (Moyo et al., 2014). Loan ratio, measured as ratio of gross loans to total assets reflects bank lending behavior in reaction to competition changes from a more liberalized financial system and this is expected to positively affect bank risk-taking (Kasman and Kasman, 2015). Asset quality is measured using loan loss reserves to gross loans ratio to denote potential default risk. This is expected to positively correlate with risk-taking (Norman et al., 2018).

Macroeconomic controls included in the study are annual per capita GDP growth rates as well as inflation rates. Annual per capita GDP growth rates account for income growth and informs individuals' ability to pay their debts (Faroukh, 2013; Fu et al., 2014) while inflation rate accounts for the effect of macroeconomic volatility (Cubillas and González, 2014; Norman et al., 2018). The study expects per capita GDP growth to negatively impact bank risk-taking while inflation rate positively influences bank risk-taking. The study further includes two variables: control of corruption and regulatory quality to assess the effect of institutional quality on the relationship between financial integration, competition and bank risk-taking behavior. Both variables are expected to improve bank stability in Africa (Farroukh, 2013).

Data for the study was collected from 405 banks from 47 African countries across five regional economic communities for the period 2007 to 2014. The bank level data is collected from the Bankscope database of *Bureau Van Dijk* (2015) and comprises detailed unconsolidated financial statements. The banks were selected based on the availability of data on Bankscope for at least half of the study period. The macroeconomic data was sourced from the World Development Indicators (WDI) database of the World Bank Group (2016) while data on the financial freedom index (FI) was collected from the Economic Freedom Index database of the Heritage Foundation (2016). The study sample is further divided into five rucks based on regional economic community membership to allow for sub-regional comparison of these relationships. Overall, the unbalanced panel contained 2,834 bank-year observations from the 405 banks sampled.

4.4 Empirical results

Table 4.1 presents the summary statistics for the regression variables while Appendix 4(A) shows the pairwise correlation between these variables. Table 4.1 shows that bank competition in Africa is very low since average Lerner index from 2007 to 2014 was 0.267 across all 47 countries sampled. Also, the AMU is found to be the least competitive among the sub-regional banking markets, with average Lerner index of 0.347, which is followed by ECCAS (0.309), SADC (0.269), ECOWAS (0.266) and EAC (0.206). However, Table 4.1 shows that bank solvency risk in Africa is generally low as average z-score are high at 27.120 for all countries under study, with the AMU banking system showing the highest stability levels, with z-scores averaging at 68.664. Also, SADC, EAC and ECOWAS recorded averages of 22.874, 20.234 and 19.127 respectively, with ECCAs recording the lowest average z-score of 16.643 for the study period. The study also finds that non-performing loans are highest in ECOWAS (8.00% of total loans), followed by the EAC (5.56%), SADC (4.06%), AMU (3.72%) and ECCAS (3.08%) respectively. Financial freedom is also generally low in Africa. The regional average is 45.24 and SADC is the most liberalized sub-region, with an average of 50.80, followed by the EAC (49.97), ECOWAS (46.12), ECCAS (36.69) and AMU is the least finically free economic community with average financial freedom index of 34.18 for the study period. The sub-regional markets show similar disparities in the other variables under study. Also, the correlation matrix in Appendix 4(A) shows that the regression variables are normal, with none showing evidence of multicollinearity since multicollinearity is only implied when two variables have a significant correlation coefficient above 0.7 (Kennedy, 2008).

Table 4.1: Summary statistics

Sample	**AFRICA**			**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
	Mean	SD.	N	Mean	SD.	Mean	**SD.**	Mean	SD.	Mean	SD.	Mean	**SD.**
z-score	27.12	78.21	2834	68.66	206.26	20.23	17.38	16.64	15.99	19.13	18.76	22.87	21.23
NPLR	0.05	0.09	2816	0.04	0.07	0.06	0.07	0.03	0.06	0.08	0.13	0.04	0.07
FI	45.24	13.09	2702	34.18	11.93	49.97	7.45	36.69	10.04	46.12	11.00	50.80	16.01
LI	0.27	0.20	2354	0.35	0.19	0.21	0.17	0.31	0.24	0.27	0.22	0.27	0.19
CIR	0.86	2.78	2825	1.21	6.89	0.93	2.48	0.86	1.06	0.76	0.25	0.75	0.66
Size	13.18	1.67	2834	14.45	1.67	12.23	1.21	12.97	1.43	13.14	1.45	13.03	1.73
CAR	0.13	0.11	2834	0.15	0.18	0.15	0.09	0.13	0.11	0.11	0.10	0.14	0.10
LoanR	0.48	0.19	2834	0.56	0.27	0.50	0.15	0.44	0.17	0.48	0.17	0.50	0.20
LonQ	0.02	0.04	2816	0.01	0.03	0.01	0.02	0.02	0.04	0.02	0.05	0.01	0.02
Divers	0.36	1.89	2825	0.11	4.88	0.42	0.10	0.40	0.15	0.39	1.12	0.41	0.26
GDPGPC	2.89	7.00	2834	2.21	16.70	2.62	4.23	2.68	5.39	3.17	3.41	2.99	3.07
Inflation	68.38	1212.6	2829	4.26	2.60	9.98	6.44	7.63	5.57	6.86	6.75	287.83	2603.4
CC	-0.58	0.56	2834	-0.50	0.38	-0.74	0.45	-1.21	0.22	-0.56	0.51	-0.14	0.62
RQty	-0.49	0.56	2834	-0.62	0.57	-0.33	0.26	-1.07	0.27	-0.45	0.37	-0.23	0.80

Source: WDI Database of the World Bank Group (2015), Heritage Foundation (2015) and Authors' estimation from Bank scope data for 405 banks across 47 African countries for 2007-2014.

4.4.1 Regression results

Tables 4.2 (A) and (B) present the baseline results for equations 7 and 8 respectively using bank z-score as a proxy for risk-taking behavior while Tables 4.3 (A) and (B) present the results for non-performing loans ratio. Also, Appendices 4.C and 4.D present results of the varying effects of the two proxies for institutional quality (control of corruption and regulatory quality). The diagnostics of the various estimations all prove the fitness of the models used in explaining bank risk-taking in Africa and the sub-regional markets and discussions are based on the results of the model supported by the Hausman specification test.

The results show that the direct effect of financial integration on bank risk-taking behavior in Africa is positive and significant, supporting the 'integration-fragility' view. However, the sub-regional analyses show that financial integration-fragility view is supported in the EAC but rejected in the Arab Maghreb Union banking sector. This means that while increased financial freedom directly increases bank solvency risk in Africa, especially in the EAC it reduces bank solvency risk in the AMU banking sector. Though Table 4.3 shows that financial integration directly reduces bank credit risk in Africa, the evidence on Table 4.2(B) suggests that its effect on bank solvency risk are less desirable. This implies that though integration and cross border banking may be improving banks credit quality, loss of profitability to new entrants may have a significant negative effect on overall stability. These findings suggest that for the period 2007 to 2014, which spanned the duration of the recent global financial crisis, increased financial integration in Africa largely promoted bank risk-taking behaviour in Africa except for the AMU, which is the least financially free banking system in Africa. These findings are consistent with the findings of Agoraki et al. (2011), Farroukh (2013) and Cubillas and González (2014) for 546 banks from 13 Central and Eastern European economies, the MENA region and 88 developing countries respectively.

Regarding the direct role of competition in determining bank risk-taking behaviour, the evidence supports the competition-fragility hypothesis. The results show that for all samples, bank market power has a significant positive effect on bank z-scores. Also, Table 4.3 shows that Lerner index has a significant negative effect on nonperforming loans in Africa and all sub-regional banking markets except in the ECCAS sub-region where Lerner index has a significant positive effect on nonperforming loans. These findings suggest that apart from ECCAS, higher monopoly power reduces bank risk-taking behavior and enhances bank stability in Africa's banking systems, supporting the 'competition-fragility' hypothesis of Marcus (1984). However, the quadratic term of the Lerner index has a significant negative effect on bank z-scores for the full sample, EAC ECOWAS and SADC and a significant positive effect on bank non-performing loans in SADC, and a significant negative effect on nonperforming loans in the ECCAS sub-region.

Table 4.2(A): Effect of financial integration and competition on bank risk-taking (z-score)

z-score	AFRICA		AMU		EAC		ECCAS		ECOWAS		SADC	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Constant	**0.828*** **	**0.410***	1.166	0.084	**1.443** **	**1.074** **	0.722	0.473	**1.685** **	**2.256*** **	**1.404*** **	0.315
	(0.254)	(0.237)	(1.010)	(0.899)	(0.541)	(0.512)	(0.719)	(0.650)	(0.672)	(0.612)	(0.436)	(0.398)
FI	-0.001	0.001	**0.010** **	**0.011*** **	-0.004	-0.002	-0.015	-0.013	-0.006	-0.004	-0.003	0.002
	(0.002)	(0.002)	(0.003)	(0.003)	(0.003)	(0.003)	(0.013)	(0.010)	(0.004)	(0.004)	(0.004)	(0.003)
LI	**1.203*** **	**1.230*** **	0.627	0.501	**0.841*** **	**0.916*** **	0.170	0.186	**1.605*** **	**1.392*** **	**0.767** **	**0.887*** **
	(0.133)	(0.133)	(0.416)	(0.410)	(0.218)	(0.223)	(0.331)	(0.336)	(0.323)	(0.325)	(0.240)	(0.262)
LI^2	**-1.464*** **	**-1.456*** **	-0.822	-0.613	**-1.226** **	**-1.331** **	0.262	0.267	**-2.555*** **	**-2.247*** **	-0.682	-0.722
	(0.257)	(0.257)	(0.720)	(0.711)	(0.456)	(0.466)	(0.564)	(0.576)	(0.594)	(0.598)	(0.446)	(0.488)
CIR	**-0.163*** **	**-0.163*** **	-0.095	-0.098	**-0.322*** **	**-0.342*** **	**-0.091*** **	**-0.089*** **	**-0.853*** **	**-0.986*** **	**-0.177*** **	**-0.160*** **
	(0.017)	(0.017)	(0.117)	(0.116)	(0.058)	(0.058)	(0.020)	(0.021)	(0.139)	(0.139)	(0.019)	(0.021)
Size	**0.081*** **	**0.105*** **	0.079	**0.152** **	**0.058***	**0.079** **	**0.080** **	**0.091** **	0.054	8.54e-5	0.041	**0.108*** **
	(0.017)	(0.016)	(0.071)	(0.061)	(0.036)	(0.033)	(0.040)	(0.039)	(0.041)	(0.036)	(0.029)	(0.028)
CAR	**6.090*** **	**5.923*** **	**5.341*** **	**5.205*** **	**4.459*** **	**4.464*** **	**6.046*** **	**5.856*** **	**8.390*** **	**7.765*** **	**7.270*** **	**6.497*** **
	(0.164)	(0.162)	(0.398)	(0.388)	(0.225)	()0.228	(0.424)	(0.425)	(0.524)	(0.506)	(0.318)	(0.335)
LoanR	**0.142***	0.125	**-0.432** **	**-0.513** **	-0.147	-0.122	**0.448** **	**0.440** **	0.064	0.274	0.088	0.030
	(0.080)	(0.079)	(0.188)	(0.182)	(0.152)	(0.152)	(0.188)	(0.190)	(0.210)	(0.205)	(0.127)	(0.136)
LonQ	**-2.451*** **	**-2.508*** **	**-1.428** **	**-1.441** **	**-1.645** **	**-1.586** **	**-1.899*** **	**-1.862*** **	**-3.384*** **	**-3.713*** **	**-3.441*** **	**-4.180*** **
	(0.259)	(0.261)	(0.612)	(0.609)	(0.549)	(0.563)	(0.389)	(0.398)	(0.533)	(0.545)	(0.625)	(0.688)
Divers	-0.006	-0.006	**0.677** **	**0.606** **	**0.856*** **	**0.797*** **	**0.278***	0.243	-0.009	-0.008	-0.039	-0.046
	(0.009)	(0.009)	(0.261)	(0.258)	(0.194)	(0.197)	(0.168)	(0.171)	(0.015)	(0.015)	(0.043)	(0.048)
GDPGPC	-0.001	-0.001	-0.001	-0.001	**0.017** **	**0.014***	-0.001	-0.001	**-0.011***	**-0.010***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.003)	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)
Inflation	1.91e-6	7.90e-7	**-0.013***	**-0.013***	**-0.006** **	**-0.005** **	**0.009** **	**0.009** **	-0.004	-0.005	3.80e-6	1.74e-6
	(5.86e-6)	(5.93e-6)	(0.008)	(0.008)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.003)	(4.72e-6)	(5.23e-6)
Hausman:	0.000	0.000	0.353	0.353	0.000	0.000	0.030	0.030	0.000	0.000	0.000	0.000
R-Square	0.472	0.471	0.572	0.569	**0.544**	0.542	0.660	0.659	0.504	0.499	0.617	0.605
F-stat./X^2	**150.74*** **	**1630.97*** **	**23.45*** **	**263.72*** **	**50.52*** **	**528.52*** **	**25.93*** **	**266.62*** **	**42.35*** **	**453.16*** **	**64.91*** **	**558.39*** **
Banks	354	354	51	51	80	80	31	31	91	91	80	80
Observs.	2220	2220	255	255	557	557	189	189	561	561	534	534

Notes: Robust standard errors are reported in parenthesis. *, **, *** implies statistical significance at 10%, 5%, and 1% respectively and coefficients in bold are statistically significant. The diagnostic test reported include; (1) the Hausman specification test p-value; (2) the R square value; (3) F-statistic and Wald-chi to indicate the joint significance of the fixed and random effects models respectively; (4) number of observations; and (5) the number of banks used in the estimation.

Table 4.2(B): Effect of interaction between financial integration and competition on bank risk-taking (z-score)

z-score	AFRICA		AMU		EAC		ECCAS		ECOWAS		SADC	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Constant	**0.943*****	**0.491****	0.955	-0.114	**1.463****	**1.117****	0.406	0.242	**1.829****	**2.365*****	**1.487*****	0.362
	(0.059)	(0.242)	(1.015)	(0.907)	(0.540)	(0.512)	(0.771)	(0.663)	(0.705)	(0.652)	(0.440)	(0.401)
FI	**-0.004***	-0.002	**0.018****	**0.018****	**-0.009****	**-0.007***	-0.003	-0.002	-0.009	-0.006	-0.006	3.57e-4
	(0.002)	(0.002)	(0.006)	(0.006)	(0.004)	(0.004)	(0.016)	(0.012)	(0.006)	(0.006)	(0.005)	(0.004)
LI	**0.738****	**0.881*****	**1.156****	**1.028***	-0.039	0.005	0.848	**1.113***	**1.177***	1.069	0.334	0.604
	(0.248)	(0.246)	(0.535)	(0.532)	(0.522)	(0.533)	(0.688)	(0.653)	(0.706)	(0.708)	(0.400)	(0.428)
LI^2	**-1.458*****	**-1.450*****	-0.630	-0.443	**-1.180****	**-1.282****	0.155	0.111	**-2.570*****	**-2.260*****	**-0.759***	-0.773
	(0.256)	(0.257)	(0.727)	(0.717)	(0.456)	(0.465)	(0.572)	(0.578)	(0.595)	(0.599)	(0.450)	(0.491)
LI*FI	**0.010****	**0.007***	-0.020	-0.019	**0.019***	**0.020***	-0.015	**-0.020***	0.009	0.007	0.009	0.006
	(0.005)	(0.004)	(0.013)	(0.012)	(0.010)	(0.011)	(0.013)	(0.012)	(0.013)	(0.013)	(0.007)	(0.007)
CIR	**-0.162*****	**-0.163*****	-0.077	-0.082	**-0.276*****	**-0.295*****	**-0.089*****	**-0.086*****	**-0.858*****	**-0.989*****	**-0.177*****	**-0.160*****
	(0.017)	(0.017)	(0.118)	(0.116)	(0.062)	(0.063)	(0.020)	(0.021)	(0.139)	(0.139)	(0.019)	(0.021)
Size	**0.083*****	**0.107*****	0.076	**0.148****	**0.065***	**0.085****	**0.072***	**0.078****	0.054	6.16e-5	0.046	**0.111*****
	(0.017)	(0.016)	(0.071)	(0.061)	(0.036)	(0.033)	(0.040)	(0.040)	(0.041)	(0.036)	(0.030)	(0.028)
CAR	**6.104*****	**5.930*****	**5.237*****	**5.115*****	**4.510*****	**4.513*****	**6.039*****	**5.881*****	**8.433*****	**7.796*****	**7.328*****	**6.540*****
	(0.164)	(0.162)	(0.402)	(0.391)	(0.226)	(0.229)	(0.424)	(0.421)	(0.528)	(0.509)	(0.321)	(0.337)
LoanR	**0.153***	**0.133***	**-0.411****	**-0.490****	-0.062	-0.036	**0.422****	**0.394****	0.068	0.277	0.096	0.035
	(0.081)	(0.079)	(0.188)	(0.182)	(0.158)	(0.158)	(0.189)	(0.191)	(0.210)	(0.205)	(0.127)	(0.136)
LonQ	**-2.458*****	**-2.513*****	**-1.405****	**-1.429****	**-1.658****	**-1.597****	**-1.887*****	**-1.820*****	**-3.382*****	**-3.707*****	**-3.472*****	**-4.192*****
	(0.259)	(0.261)	(0.610)	(0.607)	(0.548)	(0.561)	(0.389)	(0.394)	(0.534)	(0.545)	(0.625)	(0.687)
Divers	-0.006	-0.006	**0.669****	**0.601****	**0.873*****	**0.815*****	0.232	0.195	-0.009	-0.008	-0.047	-0.051
	(0.009)	(0.009)	(0.260)	(0.257)	(0.193)	(0.196)	(0.173)	(0.172)	(0.015)	(0.015)	(0.043)	(0.048)
GDPGPC	-0.001	-0.001	-0.001	-0.001	**0.017****	**0.013***	-0.001	-0.001	**-0.011***	**-0.010***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.003)	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)
Inflation	1.73e-6	6.03e-7	**-0.013***	**-0.013***	**-0.006****	**-0.005****	**0.009****	**0.010****	-0.003	-0.005	3.52e-6	1.54e-6
	(5.85e-6)	(5.92e-6)	(0.007)	(0.007)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(4.72e-6)	(5.22e-6)
Hausman:	0.000	0.000	0.370	0.370	0.000	0.000	0.085	0.085	0.000	0.000	0.000	0.000
R-square	0.473	0.472	**0.577**	0.574	0.547	0.546	0.663	0.662	0.504	0.500	0.619	0.607
F-stat./X^2	**138.89*****	**1635.18*****	**21.86*****	**268.17*****	**46.84*****	**536.20*****	**23.92*****	**275.19*****	**38.81*****	**453.65*****	**59.77*****	**561.40*****
Banks	354	354	51	51	80	80	31	31	91	91	80	80
Observs.	2220	2220	255	255	557	557	189	189	561	561	534	534

Notes: Same as in Table 4A except interaction term (LI*FI) which indicates the effect of the interaction between competition and financial integration for each sample.

The above findings are consistent with the Martinez-Mierra and Repullo (2010) theory, suggesting a nonlinear U-shaped relationship between bank competition and bank risk-taking behavior. Therefore, in African banking systems, increases in competition or a loss of market power due to increased financial integration promotes bank risk-taking behavior up to a certain threshold, beyond which further increases in bank competition will reduce bank risk-taking behavior.

Accounting for the indirect effect of financial integration on bank risk-taking through the competitive channel; Table 4.2(B) and Appendices 4.C and 4.D show that a significant positive nexus between the interaction term in Equation 8 and bank z-scores for the full sample and EAC sample and a significant negative effect in the ECCAS sub-region. Also, the interaction term has a significant positive effect on bank non-performing loans in the full sample and AMU banking sectors but a negative and insignificant effect in the EAC banking sector (Table 4.3(B)). This suggests that in concentrated banking markets, increased financial freedom and competition changes promotes bank stability even in the face of rising nonperforming loans. These findings suggest that competition changes from increased financial integration enhance bank stability in Africa. The positive effect on non-performing loans could be due to the global financial crisis which led to significant loan losses for most banks globally. However, the two results could mean that though the global financial crisis, a product of banking integration, resulted in higher bank non-performing loans, the regulatory and other benefits of financial integration led to significant stability gains in the entire region. Besides, Farroukh (2013) suggest that the positive effect on non-performing loans in the face of a significant negative effect on insolvency risk could be due to expansions in opportunities for increased lending and associated risk in these regions. Also, the findings support the view that deregulation-induced changes in bank competition promote bank stability even in a period of rising loan losses. According to this view, fear of market share and profitability losses from a more deregulated and competitive banking system and a downward movement of intermediation spreads forces banks to pursue efficiency.

Regarding the effects of institutional quality on bank risk-taking, Appendix 4.C shows that control of corruption has a significant positive effect on bank z-scores in the SADC banking sector but a significant negative effect in the AMU banking system. This means that a reduction in corruption reduces bank insolvency risk in the SADC region but increases insolvency risk in the AMU banking sector. In Appendix 4.D, the study finds a significant positive relationship between regulatory quality and bank non-performing loans in the Africa, especially in the ECOWAS and SADC banking markets. These findings show that institutional quality plays a significant role in determining bank risk-taking behavior in Africa, especially in the ECOWAS and SADC sub-regional banking markets.

Table 4.3(A): Effect of financial integration and competition on bank risk-taking (non-performing loans ratio)

NPLR	AFRICA		AMU		EAC		ECCAS		ECOWAS		SADC	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Constant	**-6.141*** **	**-3.983*** **	5.152	**4.575***	-1.877	-0.818	**-21.400****	**-10.330*** **	**-5.374****	-1.200	**-10.503*** **	**-5.590*** **
	(1.005)	(0.554)	(5.277)	(2.578)	(2.107)	(1.462)	(6.756)	(2.170)	(2.716)	(1.247)	(2.147)	(1.103)
FI	0.004	**-0.009****	-0.010	**-0.032****	**-0.023****	**-0.034*** **	-0.003	**0.054****	**0.052*** **	0.011	**0.051*** **	-0.005
	(0.006)	(0.004)	(0.014)	(0.011)	(0.010)	(0.009)	(0.133)	(0.022)	(0.013)	(0.008)	(0.015)	(0.006)
LI	-0.705	**-0.723****	-2.157	-2.760	-0.042	-0.258	2.622	**4.760****	-1.409	**-1.630***	**-2.679****	**-1.640***
	(0.485)	(0.445)	(2.122)	(1.912)	(0.904)	(0.860)	(2.317)	(2.002)	(1.069)	(0.918)	(1.08)	(0.956)
LI^2	0.872	0.592	2.841	2.056	-0.586	-0.959	-2.134	**-5.803****	1.237	1.694	**3.376****	**2.706***
	(0.953)	(0.858)	(2.658)	(2.495)	(1.988)	(1.885)	(3.936)	(3.549)	(1.934)	(1.667)	(1.719)	(1.600)
CIR	0.001	-0.024	0.012	-0.331	**-0.926*** **	**-0.781*** **	**0.298****	**0.255***	0.113	**-0.863***	0.221	0.587
	(0.078)	(0.075)	(1.217)	(0.959)	(0.224)	(0.207)	(0.129)	(0.134)	(0.691)	(0.507)	(0.398)	(0.367)
Size	**0.226*** **	**0.095****	-0.299	-0.181	0.077	-0.023	**1.222*** **	0.159	-0.064	**-0.137****	**0.337****	**0.121***
	(0.067)	(0.035)	(0.330)	(0.147)	(9.133)	(0.086)	(0.312)	(0.169)	(0.153)	(0.063)	(0.140)	(0.070)
CAR	**1.176***	0.737	-2.792	**-3.351****	**-2.139***	-1.566	5.077	2.863	**3.681****	0.960	0.087	0.539
	(0.691)	(0.589)	(2.528)	(1.726)	(1.157)	(1.048)	(4.061)	(2.961)	(1.515)	(1.095)	(1.258)	(1.132)
LoanR	**-0.669****	-0.109	**-2.937*** **	**-1.922****	**-1.038***	-0.391	-1.022	1.594	0.060	-0.089	-0.026	0.282
	(0.299)	(0.241)	(0.881)	(0.681)	(0.582)	(0.515)	(1.533)	(1.164)	(0.621)	(0.463)	(0.507)	(0.418)
LonQ	**11.470*** **	**12.271*** **	8.235	**10.251***	**16.922*** **	**17.198*** **	11.093	**12.048***	**3.292***	**5.856*** **	**14.377*** **	**15.587*** **
	(1.110)	(1.061)	(6.341)	(6.265)	(2.091)	(2.015)	(6.876)	(7.048)	(1.834)	(1.792)	(2.262)	(2.147)
Divers	0.003	0.006	-1.209	**-2.499***	**1.136**	**1.390****	0.263	**2.873****	0.951	**1.000***	0.073	0.189
	(0.042)	(0.042)	(1.554)	(1.358)	(0.761)	(0.677)	(1.849)	(1.236)	(0.604)	(0.561)	(0.213)	(0.212)
GDPGPC	-0.003	-0.001	0.003	0.007	-0.036	-0.020	-0.005	**-0.056****	**0.040****	**0.032****	-0.001	-0.001
	(0.005)	(0.005)	(0.005)	(0.005)	(0.024)	(0.022)	(0,026)	(0.026)	(0.017)	(0.016)	(0.016)	(0.016)
Inflation	**4.55e-5****	**4.5e-5****	-0.016	-0.001	-0.003	-0.005	0.037	-0.055	**0.021***	-0.001	**4.46e-5****	**4.87e-5****
	(1.74e-5)	(1.7e-5)	(0.040)	(0.040)	(0.009)	(0.008)	(0.042)	(0.038)	(0.011)	(0.010)	(1.59e-5)	(1.61e-5)
Hausman	0.000	0.000	0.068	0.068	0.066	0.066	0.000	0.000	0.000	0.000	0.000	0.000
R-Square	**0.093**	0.085	0.217	0.173	0.303	0.296	0.384	0.243	0.115	0.063	0.220	0.176
F-stat./X^2	**12.05*** **	**163.30*** **	**2.37****	**33.92*** **	**15.11*** **	**174.73*** **	**4.25*** **	**42.04*** **	**3.63*** **	**34.36*** **	**8.25*** **	**96.46*** **
Banks	287	354	27	27	76	76	20	20	74	74	71	71
Observs.	1595	2220	132	132	470	470	106	106	392	392	404	404

Notes: Robust standard errors are reported in parenthesis. *, **, *** implies statistical significance at 10%, 5%, and 1% respectively and coefficients in bold are statistically significant. The diagnostic test reported include; (1) the Hausman specification test p-value; (2) the R square value; (3) F-statistic and Wald-chi to indicate the joint significance of the fixed and random effects models respectively; (4) number of observations; and (5) the number of banks used in the estimation.

Table 4.3(B): Effect of interaction between financial integration and competition on bank risk-taking (NPL ratio)

NPLR	AFRICA		AMU		EAC		ECCAS		ECOWAS		SADC	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Constant	**-5.479*** **	**-3.500*** **	**10.768***	**7.716****	-2.106	-1.071	**-16.055****	**-9.962*** **	**-5.247***	-1.323	**-10.190*** **	**-5.336*** **
	(1.024)	(0.582)	(5.789)	(2.773)	(2.121)	(1.484)	(6.697)	(2.666)	(2.805)	(1.396)	(2.177)	(1.128)
FI	-0.012	**-0.020*** **	**-0.079****	**-0.095*** **	-0.015	**-0.025****	-0.199	0.034	**0.049****	0.013	**0.041****	-0.011
	(0.008)	(0.006)	(0.034)	(0.026)	(0.013)	(0.012)	(0.144)	(0.034)	(0.019)	(0.013)	(0.019)	(0.008)
LI	**-3.286*** **	**-2.694*** **	**-8.026****	**-8.480****	1.977	1.724	**-11.274****	2.142	-1.756	-1.378	**-3.866****	**-2.650***
	(0.961)	(0.842)	(3.416)	(2.850)	(2.310)	(2.207)	(5.252)	(3.890)	(2.148)	(1.712)	(1.724)	(1.511)
LI^2	0.849	0.677	1.886	1.177	-0.663	-0.977	-3.490	-4.915	1.224	1.712	**3.110***	2.510
	(0.950)	(0.857)	(2.644)	(2.458)	(1.990)	(1.886)	(3.781)	(3.586)	(1.938)	(1.672)	(1.746)	(1.608)
LI*FI	**0.055****	**0.041****	**0.153****	**0.154****	-0.041	-0.041	**0.352****	0.051	0.007	-0.005	0.026	0.022
	(0.018)	(0.015)	(0.071)	(0.058)	(0.043)	(0.042)	(0.121)	(0.076)	(0.039)	(0.031)	(0.030)	(0.025)
CIR	-0.005	-0.029	-0.982	-1.157	**-0.990*** **	**-0.842*** **	**0.266****	**0.252***	0.105	**-0.858***	0.168	0.556
	(0.078)	(0.075)	(1.279)	(0.985)	(0.234)	(0.216)	(0.124)	(0.131)	(0.693)	(0.509)	(0.403)	(0.371)
Size	**0.231*** **	**0.099****	-0.452	-0.179	0.071	-0.028	**1.384*** **	0.216	-0.064	**-0.135****	**0.351****	**0.124***
	(0.068)	(0.035)	(0.331)	(0.143)	(0.133)	(0.086)	(0.302)	(0.178)	(0.153)	(0.065)	(0.141)	(0.069)
CAR	**1.156***	0.692	-3.049	**-3.569****	**-2.260****	-1.637	5.923	2.725	**3.706****	0.979	0.061	0.436
	(0.689)	(0.589)	(2.483)	(1.683)	(1.164)	(1.051)	(3.883)	(3.069)	(1.523)	(1.098)	(1.258)	(1.138)
LoanR	**-0.572***	-0.083	**-3.235*** **	**-2.324*** **	**-1.107***	-0.445	-0.186	1.374	0.060	-0.093	0.031	0.310
	(0.300)	(0.241)	(0.875)	(0.681)	(0.587)	(0.518)	(1.490)	(1.205)	(0.622)	(0.464)	(0.511)	(0.417)
LonQ	**11.527*** **	**12.318*** **	9.073	**10.580***	**16.981*** **	**17.290*** **	**17.717****	**13.583***	**3.315***	**5.805*** **	**14.423*** **	**15.617*** **
	(1.106)	(1.059)	(6.232)	(6.124)	(2.093)	(2.017)	(6.938)	(7.182)	(1.841)	(1.799)	(2.263)	(2.151)
Divers	0.004	0.008	-0.898	**-2.319***	1.168	**1.421****	0.173	**2.453****	0.953	**0.996***	0.048	0.182
	(0.042)	(0.042)	(1.531)	(1.327)	(0.762)	(0.678)	(1.763)	(1.252)	(0.605)	(0.562)	(0.215)	(0.214)
GDPGPC	-0.004	-0.002	0.004	0.007	-0.035	-0.020	0.009	**-0.052****	**0.040****	**0.033****	-0.003	-0.003
	(0.005)	(0.005)	(0.005)	(0.005)	(0.024)	(0.022)	(0.025)	(0.026)	(0.017)	(0.017)	(0.016)	(0.016)
Inflation	**4.6e-5****	**4.36e-5****	0.002	0.008	-0.004	-0.006	0.031	-0.056	**0.021***	-0.002	**4.42e-5****	**4.77e-5****
	(1.73e-5)	(1.7e-5)	(0.040)	(0.039)	(0.009)	(0.008)	(0.040)	(0.039)	(0.012)	(0.010)	(1.59e-5)	(1.62e-5)
Hausman	0.000	0.000	0.124	0.124	0.076	0.076	0.000	0.000	0.000	0.000	0.000	0.000
R-Square	0.099	0.092	0.255	0.220	0.304	0.297	0.447	0.274	0.115	0.063	0.222	0.180
F-stat./X^2	**11.92*** **	**171.44*** **	**2.65****	**42.81*** **	**13.92*** **	**175.61*** **	**4.99*** **	**40.88*** **	**3.32*** **	**34.26*** **	**7.62*** **	**97.93*** **
Banks	287	287	27	27	76	76	20	20	74	74	71	71
Observs.	1595	1595	132	132	470	470	106	106	392	392	404	404

Notes: Same as in Table 5A except interaction term (LI*FI) which indicates the effect of the interaction between competition and financial integration for each sample.

The results of the control variables are generally in line with the literature and demonstrate that bank management quality, capitalization and loan quality all reduce bank insolvency and credit risks in Africa and all sub-regional banking markets. Bank cost-to-income ratio in all samples has a significant negative effect on bank z-score except in the AMU where the negative effect was insignificant. This shows that higher operating costs or lower management quality increases bank risk-taking behavior in Africa. Similarly, loan quality, measured as loan loss provisions to total loans impacts negatively on bank z-scores and positively on non-performing loans in almost all samples. This suggests that poor loan quality increases bank risk-taking behavior and vice versa. Also, bank capitalization is found to exert a significant positive effect on bank z-scores in all samples. However, capitalization was found to promote bank nonperforming loans in the EAC banking sector. This suggests that highly capitalized banks in the EAC undertook poor lending activities within the period 2007-2014. The coefficient of bank size on z-score is positive and significant in the full sample, EAC, ECCAS and SADC while its effect on nonperforming loans is positive and significant in the full sample and SADC but negative and significant in the ECOWAS banking sector. This suggests that though bank size reduces bank insolvency risk in Africa, it also promotes higher credit risk-taking among banks, especially in the SADC banking sector. However, for the ECOWAS banking sector, size helps reduce credit risk as well as insolvency risk.

With respect to loan ratio, the coefficients are positive and significant for z-score in the full sample and ECCAS but negative and significant in the AMU sample. Also, Table 4.3(A) shows that loan ratio has a negative and significant effect on the NPL ratio in the AMU and EAC samples, suggesting that a rise in bank lending activities does not lead to greater fragility in Africa. Diversification was found to reduce bank insolvency risk in AMU and EAC banking sectors. However, Table 4.4 (A and B) shows that diversification increases bank credit risk in ECCAS and ECOWAS banking markets. Per capita GDP growth rate reduces bank insolvency risk in the EAC and reduces credit risk in the ECCAS region but increases both credit and insolvency risk in the ECOWAS banking sector. Also, inflation was found to significantly increase bank insolvency (Table 4.2(A)) in the AMU, EAC and in the full sample and SADC banking sectors (see Tables 4.2(A and B), Appendices 4.C and 4.D) and credit risks (Table 4.3(A)) in the full sample and SADC banking sectors (Table 4.3(A and B)). However, the effect of inflation on bank z-score was positive in the ECCAS sample (Table 4.2.A).

4.5 Conclusions

The chapter examines the effect of financial integration and bank competition changes on bank risk-taking behavior in 47 African countries and compared the results across five regional economic communities over 2007-2014. The results on the direct effect of financial freedom on bank risk-taking behavior support the integration-fragility theory in Africa, especially in the East Africa economic community. However, in the AMU, the evidence supports the financial integration-stability theory. Also, the evidence on the effect of competition on bank risk-taking behavior support the MMR theory, indicating that bank competition increases bank risk-taking behavior, but beyond a certain threshold, further rise in bank competition reduces bank risk-taking behavior in Africa and all its sub-regional markets. The results also suggest that competition changes from increased financial integration enhance bank stability in Africa. The chapter therefore concludes that African economies are unable to fully enjoy the stability benefits of financial integration due to the lack of competitiveness in their banking systems. The results on the effect of the control variables suggest that bank capitalization, management quality and loan quality reduce bank risk-taking behavior and promote bank stability in Africa. Bank size and loan ratio also proved to play a significant role in reducing bank fragility in Africa, implying that in the presence of increasing financial freedom, large banks are better able to diversify their loan portfolios and remain stable. The empirical analysis further shows that revenue diversification in Africa significantly reduces bank fragility, especially in the AMU, EAC and ECCAS banking systems. Inflation however increases bank non-performing loans in Africa, especially in the ECOWAS and SADC banking systems.

These findings have significant implications for academics, bank managers, regulators and policy makers. First, contrary to the view that a more liberalized and competitive banking system enhances bank stability, the results suggest that increasing local and foreign participation in banking markets through greater financial freedom may be detrimental to bank stability up to a certain threshold, beyond which further competition changes induced by greater financial liberalization will enhance stability. The sub-regional evidence also show that policy initiatives need to be tailored for the specific conditions in each regional economic community since the form the epicenters of financial integration in Africa and wholesale policies may not always produce equivalent results. The results also show that regulatory authorities should continue to ensure that banks in Africa maintain adequate capital levels, and high-quality managers to enhance their stability. The maintenance of high quality loan portfolios and a diversified income portfolio should also be encouraged among banks in Africa. While these findings may provide some useful insights,

the study is not without limitations. Further studies could examine the various thresholds beyond which further integration-induced competition reduces bank risk-taking behavior in Africa. The findings also provide guidance for further research on the channels through which an optimal resolution of the trilemma between greater financial integration and market competitiveness and financial stability can be achieved for higher economic growth.

References

African Development Bank. (2010). Financial sector integration in three regions of Africa: How regional financial integration can support growth, development and poverty reduction. Technical Report. Cote D'Ivoire, 1-142.

Agoraki, M.E., Delis, M. and Pasiouras, F. (2011). Regulations, competition and bank risk-taking in transition countries. *Journal of Financial Stability*, 7(1), 38-48.

Amidu, M. and Wolfe, S. (2013). Does bank competition and diversification lead to greater stability? Evidence from emerging markets. *Review of Development Finance*, 3(3), 152–166.

Beck, T. and Cull, R. (2014). Banking in Africa, In Berger, A.N., P. Molyneux and J.O.S. Wilson (eds.) *Oxford Handbook of Banking, 2nd edition*. Oxford: Oxford University Press.

Beck, T., De Jonghe, O. and Schepens, G. (2013). Banking competition and stability: Cross-country heterogeneity. *Journal of Financial Intermediation,* 22, 218–244.

Beck, T., Demirgüç-Kunt, A., and Levine, R. (2006). Bank concentration, competition, and crises: First results. *Journal of Banking and Finance, 30*(5), 1581-1603

Beck, T., Maimbo, S. M., Faye, I. and Triki, T. (2011). Financing Africa through the crisis and beyond. *World Bank*, Washington D.C.

Berger, A.N., Klapper, L.F. and Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, 35, 99–118.

Bourgain, A., Pieretti, P. and Zanaj, S. (2012). Financial Openness, Disclosure and Bank risk-taking in MENA countries. *Emerging Markets Review*, 13, 283–300.

Boyd, J. H., and De Nicoló, G. (2005). The Theory of Bank Risk-Taking and Competition Revisited. *Journal of Finance, 60*(3), 1329-1343.

Brambor, T., Clark, W.R. and Golder, M. (2006). Understanding Interaction Models: Improving Empirical Analyses. *Political Analysis*, 14, 63–82

Brei, M., Jacolin, L. and Noah, A. (2018). Credit risk and bank competition in Sub-Saharan Africa. *Banque de France Working* Paper No. 664. February 2018. 1-35. Available at https://publications.banque-france.fr/sites/default/files/medias/documents/wp664_0.pdf

Cubillas, E. and González, F. (2014). Financial liberalization and bank risk-taking: International evidence. *Journal of Financial Stability*, 11(3), 32-48.

Caminal, R. and Matutes, C. (2002). Market power and bank failures. *International Journal of Industrial Organization*, 20, 1341-1361.

Coccorese, P. (2014). Estimating the Lerner index for the banking industry: a stochastic frontier approach. *Applied Financial Economics*, 24(2), 73-88.

Cubillas, E. and González, F. (2014). Financial Liberalization and Bank Risk-Taking: International Evidence. *Journal of Financial Stability*, 11(3), 32-48.

Farroukh, A. (2013). Financial Integration, Banking Competition Changes and Financial Stability: The Case of the MENA Region. *Financial and Monetary Policy Studies*, 36, 173-193.

Fiordelisi, F. and Mare, D. S. (2014). Competition and financial stability in European cooperative banks. *Journal of International Money and Finance*, 45, 1-16.

Fu, X.M, Y.R. Lin and Molyneux, P. (2014). Bank competition and financial stability in Asia Pacific. *Journal of Banking and Finance*, 38(C), 64-77.

Goetz, M.R. (2018). Competition and bank stability. *Journal of Financial Intermediation*, 35(A), 57-69.

Hamdaoui, M., Zouari, A. and Maktouf, S. (2016). The effect of financial liberalization on banking sector stability. *International Review of Applied Economics*, 30(5), 644–667.

Jiménez, G., López, J.A. and Saurina, J. (2013). How does competition affect bank risk-taking? *Journal of Financial Stability*, 9, 185-195.

Joyce, J. (2011). Financial globalization and banking crisis in emerging markets. Open *Economies Review*, 22(5), 875-895

Kabir, M.N. and Worthington, A.C. (2017). The 'competition–stability/fragility 'nexus: A comparative analysis of Islamic and conventional banks. *International Review of Financial Analysis*, 50(1), 11-128.

Kasman, S. and Kasman, A. (2015). Bank competition, concentration and financial stability in the Turkish banking industry. *Economic Systems*, 39(3), 502–517.

Keeley, M. (1990). Deposit insurance, risk and market power in banking. *American Economic Review*, 80, 1183-1200.

Leon, F. (2016). Does the Expansion of Regional Cross-border Banks Affect Competition in Africa? Indirect Evidence. *Research in International Business and Finance, 37,* 66–77.

Li, X. and Su, D. (2016). Capital account liberalization and bank risk: Bank level evidence. Available at https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=RESConf2017&paper_id=956

Marcus, A. J. (1984). Deregulation and bank financial policy. *Journal of Banking and Finance, 8*(4), 557–565.

Martinez-Miera, D. and Repullo, R. (2010). Does competition reduce the risk of bank failure? *Review of Financial Studies, 23*(10), 3638–3664.

Motelle, S. and Biekpe, N. (2014). Financial integration and stability in the Southern African Development Community. *Journal of Economics and Business*, 79, 100-117.

Moyo, J., Nandwa, B., Oduor, J. and Simpasa, A. (2014). Financial sector reforms, competition and banking system stability in Sub-Saharan Africa. Paper presented at the joint RES-SPR Conference on "Macroeconomic Challenges Facing Low-Income Countries". *International Monetary Fund*, Washington, DC—January 30–31, 2014.

Norman, A.H.M., Gee, C.S. and Isa, C.R. (2018). Does bank regulation matter on the relationship between competition and financial stability? Evidence from Southeast Asian countries. *Pacific-Basin Finance Journal*, 48, 144–161

Oduor, J., Ngoka, K. and Odongo, M. (2017). Capital requirement, bank competition and stability in Africa. *Review of Development Finance*, 7(1), 45-51.

Rossi, M. (1999). Financial fragility and economic performance in developing economies: Do capital controls, prudential regulation and supervision matter? *IMF Working Paper* No.WP/99/66. Washington, DC: IMF.

Schoemaker, D. (2011). The financial trilemma. *Tinbergen Institute Discussion Paper* No. 11-019/2/DSF 7, Tinbergen Institute, Amsterdam and Rotterdam.

Schaeck, K. and Cihák, M. (2014). Competition, efficiency, and stability in banking. *Financial Management, 43*(1), 215–241.

Shijaku, G. (2017). Does concentration matter for bank stability - Evidence from Albanian Banking System. *Journal of Central Banking Theory and Practice,* 6(3), *67-94.*

Sissy, A.M., Amidu, M. and Abor, J.Y. (2017). The effects of revenue diversification and cross border banking on risk and return of banks in Africa. *Research in International Business and Finance*, 40, 1–18.

Smaga, P. (2014). The concept of systemic risk. *Systemic Risk Centre Special* Paper No.5. London School of Economics and Political Science, London, UK.

Soedarmono, W. and Tarazi, A. (2016). Competition, financial intermediation, and riskiness of banks: Evidence from the Asia-Pacific Region. *Emerging Markets Finance and Trade*, 52, 961–974.

Soedarmono, W., Machrouh, F. and Tarazi, A. (2013). Bank competition, crisis and risk taking: Evidence from emerging markets in Asia. *Journal of International Financial Markets, Institutions and Money*, 23, 196-221

Tabak, B. M., Fazio, D. M. and Cajueiro, D. O. (2012). The relationship between banking market competition and risk-taking: Do size and capitalization matter? *Journal of Banking and Finance*, 36(12), 3366-3381.

Tabak, B.M., Gomes, G.M. and da Silva Medeiros, M. (2015). The impact of market power at bank level in risk-taking: The Brazilian case. *International Review of Financial Analysis*, 40,154-165.

Turk-Ariss, R. (2010). On the implications of market power in banking: Evidence from developing countries. *Journal of Banking and Finance*, 34(4), 765–775.

World Bank (2007). Financial sector integration in two regions of Sub-Saharan Africa. January 2007, Washington DC.

Appendices

Appendix 4.A: Pairwise correlation matrix

	z-score	NPLR	FI	LI	CIR	Size	CAR	LonR	LonQ	Divers	GDPGPC	Inflation	CC	RQty
z-score	1.000													
NPLR	-0.113***	1.000												
FI	-0.003	-0.164***	1.000											
LI	0.218***	-0.072**	-0.052**	1.000										
CIR	-0.021	0.057**	-0.041**	-0.356***	1.000									
size	0.221***	0.018	-0.043**	0.208***	-0.089***	1.000								
CAR	0.168***	-0.089***	-0.089***	-0.030	0.276***	-0.298***	1.000							
LonR	0.084***	0.0381	0.090***	-0.041**	-0.106***	0.115***	-0.140***	1.000						
LonQ	-0.160***	0.281***	-0.0051	0.0254	-0.009	-0.039**	-0.025	0.016	1.000					
Divers	-0.086	0.058**	-0.037*	0.113***	-0.064***	-0.053**	-0.093***	0.014	0.051**	1.000				
GDPGPC	-0.019	0.005	-0.027	0.043**	0.042**	-0.014	0.015	-0.048**	-0.003	0.034*	1.000			
Inflation	-0.029	0.029	-0.138***	-0.035*	-0.001	-0.012	0.020	0.022	0.008	0.011	-0.010	1.000		
CC	0.053**	-0.037	0.461***	0.010	-0.014	0.039**	-0.078***	0.229***	-0.056	-0.017	0.011	-0.075***	1.000	
RQty	0.059**	-0.071**	0.147***	-0.065**	-0.029	0.089***	-0.114***	0.291***	-0.037*	-0.017	-0.012	-0.132***	0.739***	1.000

Source: WDI Database of the World Bank Group, ECONFREE database of Heritage Foundation and authors' estimation from Bank scope database for the period 2007-2014. **Notes**: *, **, *** implies statistical significance at 10%, 5%, and 1% respectively.

Appendix 4.B: Sub-regional summary of Lerner index input and output variables

REC	AR	W1	W2	W3	TC	YTA	EQ	MC
AMU	0.0586055	0.0096484	0.9786734	0.0192775	150757.3	4934494	533885.1	0.0345179
EAC	0.1232441	0.0289684	1.869092	0.0467415	30710.04	378792	56028.78	0.1061419
ECCAS	0.1079368	0.0216124	1.568615	0.0194602	63996.06	1049252	126605	0.0872157
ECOWAS	0.1162368	0.022072	1.476843	0.0432562	106302.1	1296216	187614.8	0.0877382
SADC	0.1240021	0.0267893	2.351427	0.0526478	323465.8	4585242	353811.3	0.0914988
AFRICA	0.1075302	0.021701	1.666357	0.0399346	151662.1	2537843	250781	0.0846648

Source: Authors' estimation from Bank scope data for 405 banks across 47 African countries for 2007-2014. All variables are as defined under equations 11 and 12.

Appendix 4.C: Effect of control of corruption on the relationship between financial integration, competition and bank risk-taking

z-score	AFRICA		AMU		EAC		ECCAS		ECOWAS		SADC	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Constant	**0.961*****	**0.492****	1.245	0.027	**1.460****	**1.161****	0.269	0.118	**1.895****	**2.351*****	**1.428*****	0.557
	(0.259)	(0.242)	(1.023)	(0.907)	(0.542)	(0.513)	(0.810)	(0.706)	(0.707)	(0.654)	(0.442)	(0.401)
FI	-0.003	-0.002	**0.018****	**0.019****	**-0.009****	**-0.007***	-0.003	-0.001	-0.009	-0.006	-0.006	-0.004
	(0.002)	(0.002)	(0.006)	(0.006)	(0.004)	(0.004)	(0.017)	(0.012)	(0.006)	(0.006)	(0.005)	(0.004)
LI	**0.733****	**0.881*****	**1.112****	**0.984***	-0.032	-0.103	0.828	**1.091***	**1.170***	1.069	0.310	0.465
	(0.133)	(0.246)	(0.533)	(0.529)	(0.530)	(0.540)	(0.690)	(0.655)	(0.706)	(0.708)	(0.399)	(0.426)
LI^2	**-1.449*****	**-1.452*****	-0.524	-0.355	**-1.183****	**-1.221****	0.138	0.097	**-2.572*****	**-2.264*****	**-0.764***	**-0.807***
	(0.257)	(0.257)	(0.726)	(0.714)	(0.459)	(0.467)	(0.574)	(0.580)	(0.594)	(0.599)	(0.449)	(0.486)
LI*FI	**0.010****	**0.007***	-0.019	-0.019	**0.019***	**0.022****	-0.014	-0.019	0.009	0.007	0.009	0.008
	(0.005)	(0.004)	(0.013)	(0.012)	(0.011)	(0.011)	(0.013)	(0.012)	(0.013)	(0.013)	(0.007)	(0.007)
CC	-0.062	0.017	**-0.333***	**-0.291***	0.007	-0.097	-0.117	-0.110	-0.171	0.031	0.150	**0.326*****
	(.017)	(0.049)	(0.188)	(0.176)	(0.082)	(0.077)	(0.207)	(0.210)	(0.133)	(0.116)	(0.105)	(0.093)
CIR	**-0.163*****	**-0.163*****	-0.101	**-0.097**	**-0.276*****	**-0.302*****	**-0.088*****	**-0.086*****	**-0.849*****	**-0.988*****	**-0.176*****	**-0.160*****
	(0.017)	(0.017)	(0.118)	(0.116)	(0.063)	(0.063)	(0.020)	(0.021)	(0.139)	(0.139)	(0.019)	(0.021)
Size	**0.079*****	**0.107*****	0.045	**0.127****	0.066*	**0.077****	**0.070***	**0.076***	0.043	0.003	**0.051***	**0.116*****
	(0.018)	(0.016)	(0.072)	(0.062)	(0.036)	(0.034)	(0.040)	(0.040)	(0.042)	(0.038)	(0.030)	(0.028)
CAR	**6.109*****	**5.930*****	**5.328*****	**5.171*****	**4.510*****	**4.514*****	**6.010*****	**5.853*****	**8.511*****	**7.797*****	**7.350*****	**6.643*****
	(0.164)	(0.162)	(0.403)	(0.390)	(0.226)	(0.229)	(0.428)	(0.425)	(0.531)	(0.509)	(0.321)	(0.335)
LoanR	**0.150***	**0.133***	**-0.419****	**-0.484****	-0.061	-0.056	**0.417****	**0.390****	0.059	0.273	0.085	0.016
	(0.081)	(0.079)	(0.187)	(0.181)	(0.160)	(0.159)	(0.190)	(0.191)	(0.210)	(0.206)	(0.127)	(0.135)
LonQ	**-2.464*****	**-2.511*****	**-1.313****	**-1.347****	**-1.655****	**-1.643****	**-1.879*****	**-1.812*****	**-3.375*****	**-3.704*****	**-3.363*****	**-3.903*****
	(0.259)	(0.261)	(0.609)	(0.605)	(0.549)	(0.562)	(0.390)	(0.395)	(0.533)	(0.545)	(0.629)	(0.686)
Divers	-0.006	-0.006	**0.697****	**0.622****	**0.874*****	**0.799*****	0.238	0.201	-0.010	-0.008	-0.041	-0.036
	(0.009)	(0.009)	(0.259)	(0.255)	(0.194)	(0.197)	(0.174)	(0.173)	(0.015)	(0.015)	(0.044)	(0.048)
GDPGPC	-0.001	-0.001	-0.001	-0.001	**0.017****	**0.014****	-0.001	-0.001	**-0.010***	**-0.011***	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.004)	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)
Inflation	1.65e-6	6.40e-7	**-0.013***	**-0.013***	**-0.006****	**-0.005****	**0.009****	0.010**	-0.003	-0.005	3.84e-6	2.53e-6
	(5.85e-6)	(5.93e-6)	(0.007)	(0.007)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(4.72e-6)	(5.18e-6)
Hausman	0.000	0.000	0.411	0.411	0.000	0.000	0.100	0.100	0.000	0.000	0.000	0.000
R-square	0.474	0.472	0.584	0.581	0.547	0.544	0.664	0.663	0.506	0.499	0.621	0.609
F-stat.X^2	**128.32*****	**1635.10*****	**20.64*****	**274.18*****	**43.15*****	**538.23*****	**22.00*****	**274.62*****	**36.01*****	**453.54*****	**55.46*****	**584.66*****
Banks	354	354	51	51	80	80	31	31	91	91	80	80
Observs.	2220	2220	255	255	557	557	189	189	561	561	534	534

Appendix 4.D: Effect of regulation quality on the relationship between financial integration, competition and bank risk-taking

	AFRICA		AMU		EAC		ECCAS		ECOWAS		SADC	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Constant	**0.985*** **	**0.600** **	1.197	-0.208	**1.408** **	**1.066** **	0.284	0.052	**2.090** **	**2.810*** **	**1.493** **	**0.798***
	(0.265)	(0.250)	(1.201)	(0.995)	(0.544)	(0.517)	(0.839)	(0.768)	(0.763)	(0.674)	(0.479)	(0.477)
FI	**-0.004***	-0.002	**0.018** **	**0.018** **	**-0.008** **	**-0.006***	-0.003	-0.001	-0.009	-0.009	-0.006	-0.004
	(0.002)	(0.002)	(0.006)	(0.006)	(0.004)	(0.004)	(0.017)	(0.012)	(0.006)	(0.006)	(0.005)	(0.005)
LI	**0.740** **	**0.882*** **	**1.144** **	**1.039***	-0.049	-0.002	0.840	**1.135***	**1.140***	0.995	0.334	0.512
	(0.248)	(0.246)	(0.537)	(0.534)	(0.522)	(0.533)	(0.690)	(0.658)	(0.707)	(0.706)	(0.400)	(0.430)
LI^2	**-1.460*** **	**-1.450*** **	-0.621	-0.453	**-1.217** **	**-1.313** **	0.171	0.128	**-2.525*** **	**-2.22*** **	**-0.760***	**-0.790***
	(0.257)	(0.257)	(0.729)	(0.718)	(0.458)	(0.467)	(0.575)	(0.586)	(0.597)	(0.597)	(0.450)	(0.490)
LI*FI	**0.010** **	**0.008***	-0.020	-0.019	**0.019***	**0.020***	**-0.014**	**-0.020***	0.010	0.009	0.009	0.007
	(0.005)	(0.004)	(0.013)	(0.012)	(0.010)	(0.011)	(0.013)	(0.012)	(0.013)	(0.013)	(0.007)	(0.007)
RQty	0.043	**0.090***	-0.037	0.022	-0.099	-0.083	-0.071	-0.089	0.199	**0.433** **	0.004	**0.176***
	(0.057)	(0.052)	(0.098)	(0.089)	(0.110)	(0.111)	(0.188)	(0.191)	(0.223)	(0.180)	(0.126)	(0.106)
CIR	**-0.162*** **	**-0.162*** **	-0.082	-0.080	**-0.284*** **	**-0.301*** **	**-0.089*** **	**-0.086*** **	**-0.864*** **	**-0.987*** **	**-0.177*** **	**-0.164*** **
	(0.017)	(0.017)	(0.118)	(0.116)	(0.063)	(0.064)	(0.020)	(0.021)	(0.139)	(0.139)	(0.019)	(0.021)
Size	**0.081*** **	**0.104*** **	0.058	**0.155** **	**0.065***	**0.085** **	**0.075***	**0.083** **	0.042	-0.013	0.046	**0.098*** **
	(0.017)	(0.016)	(0.085)	(0.068)	(0.036)	(0.033)	(0.041)	(0.041)	(0.043)	(0.037)	(0.031)	(0.029)
CAR	**6.096*** **	**5.921*** **	**5.246*** **	**5.116*** **	**4.530*** **	**4.531*** **	**6.033*** **	**5.861*** **	**8.340*** **	**7.718*** **	**7.328*** **	**6.567*** **
	(0.164)	(0.162)	(0.403)	(0.392)	(0.227)	(0.230)	(0.425)	(0.425)	(0.538)	(0.508)	(0.321)	(0.337)
LoanR	**0.147***	0.116	**-0.421** **	**-0.484** **	-0.056	-0.031	**0.425** **	**0.397** **	0.049	0.206	0.094	-0.012
	(0.081)	(0.080)	(0.190)	(0.183)	(0.159)	(0.158)	(0.190)	(0.193)	(0.211)	(0.207)	(0.133)	(0.139)
LonQ	**-2.466*** **	**-2.531*** **	**-1.387** **	**-1.440** **	**-1.633** **	**-1.576** **	**-1.891*** **	**-1.820*** **	**-3.419*** **	**-3.762*** **	**-3.472*** **	**-4.166*** **
	(0.259)	(0.261)	(0.614)	(0.609)	(0.548)	(0.561)	(0.390)	(0.399)	(0.535)	(0.544)	(0.626)	(0.686)
Divers	-0.006	-0.006	**0.668** **	**0.604** **	**0.889*** **	**0.830*** **	0.234	0.193	-0.008	-0.006	-0.047	-0.050
	(0.009)	(0.009)	(0.260)	(0.257)	(0.194)	(0.197)	(0.174)	(0.174)	(0.015)	(0.015)	(0.043)	(0.048)
GDPGPC	-0.001	-0.001	-0.001	-0.001	**0.017** **	**0.014***	-.001	-0.001	**-0.012** **	**-0.013** **	0.001	6.03e-5
	(0.001)	(0.001)	(0.001)	(0.001)	(0.007)	(0.007)	(0.003)	(0.004)	(0.006)	(0.006)	(0.004)	(0.005)
Inflation	1.69e-6	6.27e-7	**-0.014***	**-0.013***	-0.006	-0.006	**0.009** **	**0.010** **	-0.004	**-0.007***	3.52e-6	1.61e-6
	(5.85e-6)	(5.92e-6)	(0.008)	(0.007)	(0.002)	(0.003)	(0.004)	(0.004)	(0.004)	(0.004)	(4.73e-6)	(5.21e-6)
Hausman:	0.000	0.000	0.426	0.426	0.000	0.000	0.043	0.043	0.000	0.000	0.000	0.000
R-Square	0.474	0.472	0.578	0.574	0.548	0.547	0.663	0.662	0.505	0.501	0.619	0.607
F-stat./X^2	**128.22*** **	**1639.10*** **	**20.10*** **	**267.73*** **	**43.28*** **	**537.64*** **	**21.96*** **	**268.94*** **	**35.87*** **	**462.53*** **	**55.05*** **	**567.27*** **
Banks	354	354	51	51	80	80	31	31	91	91	80	80
Observs.	2220	2220	255	255	557	557	189	189	561	561	534	534

Notes: Same as in Table 4A except interaction term (LI*FI) for the effects of financial integration in competitive markets as well as the inclusion of a second proxy for institutional quality, regulatory quality (RQty) to assess the effect of quality regulatory environments on bank risk-taking behavior in African banking markets.

CHAPTER FIVE

FINANCIAL INTEGRATION, COMPETITION AND BANK EFFICIENCY: EVIDENCE FROM AFRICA'S SUB-REGIONAL MARKETS

5.1 Introduction

This chapter examines the role of financial integration in fostering bank competition and efficiency in five regional economic communities (RECs) of Africa for the period 2007-2014. Since the mid-to-late 1980s, there has been a crusade for the abolishing of repressive financial regulations in favour of financial freedom and deeper integration in Africa and other emerging markets (Sarpong-Kumankoma et al., 2017). This follows the widely held view that deeper financial integration stimulates competition and fosters efficiency in financial markets (Boyd and de Nicolo, 2005; Casu and Girardone, 2009; Andries and Capraru, 2012). Besides, the positive nexus between financial integration and economic growth is often premised on its ability to optimize resource accumulation and distribution through effects on the competitiveness and efficiency of financial intermediaries. Therefore, Africa's financial integration efforts are generally aimed at promoting economic growth through the stimulation and harmonization of competition and efficiency among financial intermediaries.

According to Hicks (1935) 'quiet-life' hypothesis (QLH), lack of competitiveness in Africa's bank dominated financial markets is a recipe for managerial inefficiencies since banks can charge monopoly rents over and above their marginal cost to stay profitable (Leon, 2015). African financial integration is therefore expected to open the banking sector for greater competition and force banks to become innovative and efficient to attract demand, gain market share and stay profitable (Fu and Heffernan, 2009; Sarpong_Kumankoma et al., 2017). However, several recent studies have found evidence of less desirable effects of financial integration for bank competition, efficiency and economic growth (Casu and Giradone, 2009; Leon, 2015; Sarpong_Kumankoma et al., 2017). Therefore, evaluating the evolution and causal nexus between bank competition and efficiency in Africa's sub-regional markets is important for assessing the overall effects of the recent spate of financial reforms in emerging economies[25] (Casu and Giradone, 2009; 2010; Andries and Capraru, 2014). However, the literature on the effects of Africa's financial integration on convergence of efficiency and competiveness of Africa's

[25] Leon (2015) opine that lower spreads in a competitive market forces banks to increase the scope and scale of their activities, to seek out new clients and to adopt innovative technologies for faster and quality service delivery, raising their operational cost, especially in the short-run. Besides, revenue losses from new untested clienteles and products all increase bank operational cost.

banking markets seem nonexistent and the limited studies on the nexus between competition and bank efficiency largely rely on unidirectional regression analysis.

This chapter seeks answers to the following key questions: Has years of financial reforms and efforts at deeper financial integration in Africa improved the competitiveness and efficiency of banks in the region and is there a feedback causal relationship between bank competition and efficiency in emerging markets? To answer these questions, the study estimates bank Lerner index and two measures of bank efficiency (cost and profit efficiency) using the Stochastic Frontier Analysis (SFA) technique. The study then employs β- and σ-convergence tests as well as panel granger-causality tests to the competition and efficiency scores of 405 banks in 47 African countries for the period 2007-2014. The study further compares these results across five major regional economic communities of Africa to account for the sub-regional differences in the effect of banking integration on the nexus between bank competition and efficiency across Africa. This is because financial integration in Africa is largely centered at the RECs and efforts to achieve the gross harmonization of banking operations across Africa has been less successful and clogged with several major setbacks. Answers to these questions are therefore important to policy makers in Africa and other emerging economies seeking the growth benefits of financial integration through improvements in the competitiveness and efficiency of their banking sectors.

The chapter makes several contributions to the on-going conversation about the cost and benefits of financial integration in emerging markets. First, the study analyzes the evolution of bank competition and efficiency in five sub-regional markets of Africa over 2007-2014 to assess the impact of financial integration on bank competition and efficiency. The study follows the work of Casu and Giradone (2009; 2010), Turk-Aris (2010), Williams (2012) and Sarpong-Kumankoma et al. (2017) to estimate bank Lerner index, cost and profit efficiency using Stochastic Frontier Analysis (SFA) approach and test their convergence properties using β- and σ-convergence tests. According to Casu and Giradone (2010) banking convergence provides evidence of the levelling effect of financial integration in promoting a homogenous banking system in line with the law of one price (Andries and Capraru, 2014). To the best of the researcher's knowledge, there seem to be no study examining banking convergence in Africa. Also, the comparative dimension is novel and allows for peer-learning and the tailoring of policy initiatives for optimal results at the REC level while guiding the overall regional integration agenda of Africa. Second, the study departs from the convention in the banking literature on Africa by testing for reverse causality between bank competition and cost efficiency in Africa in a Granger-causality fashion (Casu and Girardone, 2009). These results are also compared across the five regional economic communities to account for sub-regional variations in the role of financial integration in determining the

competition-efficiency nexus in the banking sector of emerging economies. By examining the reverse causal nexus between competition and bank efficiency, the study is able to test the quiet-life hypothesis and the efficient-structure hypothesis as well as the feedback theory in African banking markets. To the best of the author's knowledge, this is the first study to conduct a sub-regional analysis of the causal nexus between bank competition and efficiency in Africa and the first to test the three theories in a single study.

The rest of the chapter is organized as follows. Section 5.2 reviews the relevant literature on financial integration, competition and bank efficiency. Section 5.3 describes the research methodology while Section 5.4 presents and discusses the results of the study. Section 5.5 concludes the chapter.

5.2 Literature review

Studies on the relationship between competition and bank efficiency are guided by two competing theories. On one hand, the 'competition-efficiency' view espouse that a positive nexus exist between bank competition and efficiency and that in competitive markets, banks pursue efficiency goals to stay profitable. This view originates from the 'efficient-structure' hypothesis and flows through various channels (Andries and Capraru, 2014). First, rising competition in the banking sector motivates management to either specialize their products to serve certain market niches efficiently (Zarutskie, 2013) or enhance their credit quality and lower default using new and more efficient technologies (Chen, 2007; Dick and Lehnert, 2010). This view is also supported in part by the Hicks' (1935) 'quiet-life' theory, which intimates that the leverage enjoyed by managers to charge monopoly rents in uncompetitive banking markets, breeds managerial inefficiencies among banks. Using data from 457 German banks for the period 1994–2006, Koetter and Vins (2008) found a significant positive nexus between higher competition and bank efficiency. Similar results were found by Delis and Tsionas (2009) using data from 11 European Union countries and the United States for 2000–2007. Also, Cocoresse and Pellechia (2010) found that bank competition enhanced the efficiency of 714 Italian banks for the period 1992 -2007.

In contrast, the 'competition-inefficiency' view contends that rising competition in banking markets rather incites inefficiency among banks. For instance, in a competitive banking market, depositors and borrowers become more disloyal to banks, increasing the need for banks to attract new clients at additional cost (Boot and Schmeijts, 2006). Moreover, the need to seek new clients from unchartered and previously untapped markets increases information gathering cost and potential credit risk which increases bank operation cost. For instance, Weill (2004) found a negative relationship between

competition and bank inefficiency in 12 European countries for the period 1994–1999. Also, Pruteanu-Podpiera et al. (2008) found that higher competition reduced efficiency in a sample of Czechian banks over the period 1994-2005. Similarly, Williams (2012) found a negative effect of bank competition on the efficiency of 419 Latin American banks between 1988 and 2008.

In Africa, only a handful of studies[26] have examined the nexus between competition and bank efficiency and their findings have failed to provide a unanimous conclusion (Leon, 2015). For instance, Chen (2009) found a significant positive nexus between competition and bank efficiency using data from 77 banks from 10 middle income countries in Africa. Also, Sunil and Binsheng (2011) found that financial reforms promoted spurred competitiveness among Egyptian banks and promoted production efficiency in the banking industry between 1992 and 2007. Similarly, Zhao and Murinde (2011) found that banking sector reforms had a significant direct positive effect and an indirect effect on bank efficiency through the channel of competition in the Nigerian banking industry during the period 1993-2008. Using data from the 40 Kenyan banks for the period 1997 to 2009, Kamau (2011) argue that policies that stimulate competition in the banking sector enhance bank efficiency in Kenya. Ali and Sghaier (2012) also found a significant positive nexus between competition and bank efficiency in the Tunisian banking industry between 1990 and 2009. A recent study by Ajisafe and Akinlo (2014) confirmed the positive effect of bank competition on efficiency of the Nigerian banking sector for the period 1990 and 2009. They concluded that banking sector reforms in Nigeria have stimulated competition in the banking sector and this has a positive effect on bank efficiency.

However, Ningaye et al. (2014) found mixed results, showing that though bank competition favorably affected bank profit efficiency, its effect on bank cost efficiency are less desirable in the Economic and Monetary Community of Central Africa (CEMAC) banking sector for the 2003–2010 period. Also, Sarpong-Kumankoma, et al. (2017) found an inverse relationship between competition and bank efficiency in 11 Sub-Saharan African countries for the 2006-2012 period, though the relationship improves with greater financial freedom. In the same vein, Leon (2014) found evidence of a negative relationship between increasing competition and bank efficiency. Despite these limited studies, no single study has done a comparative analysis of the causal nexus between bank competition and efficiency despite the concentration of integration efforts at the sub-regional markets in Africa.

Banking convergence analysis has recently emerged as an increasingly important method for evaluating the impact and effectiveness of banking integration in driving the competitiveness efficiency and other performance metrices of banking industries. It is often used to examine how deregulation and

[26] Largely single country studies doted across the continent.

international financial integration affects the leveling of bank competition, efficiency and profitability (Casu and Giradone, 2009; Weill, 2009)[27] as well as economic growth across countries in a common market (Affinito, 2011). For instance, Casu and Giradone (2009; 2010) and Andries and Capraru (2014) employed convergence analysis with Granger type causality tests to assess the effects of financial integration or deregulation-induced changes in bank competition on bank efficiency. However, there seem to be no single study on banking competition and efficiency convergence in Africa.

In sum, the study is motivated by the gaps identified in the empirical banking literature on Africa. This chapter therefore seeks to address these gaps by providing policy makers, regulators and bank managers with the evidence on the convergence properties and causal nexus between bank competition and efficiency in five major regional economic communities of Africa for the 2007-2014 period.

5.3 Data and methodology

In this section, the data and three-step methodological approach used for examining the relationship between financial integration, bank competition and efficiency in Africa is described. In the first step, the study explains how bank competition, cost and profit efficiency in Africa are estimated using the Stochastic Frontier Analysis (SFA) method of Aigner et al. (1977). Second, the chapter explains how β- and σ-convergence of bank competition and the two efficiency measures are executed in the study. In the third step, the Granger-type causality test procedure is explained.

First, the study uses the SFA framework to estimate bank competition using the Lerner index in line with Koetter et al. (2008) and Sarpong-Kumankoma, et al. (2017). According to Berger et al. (2009), Lerner index estimates a bank's markup of prices over marginal cost, revealing its market power. This is mathematically defined as:

$$L_{it} = \frac{(AR_{it} - MC_{it})}{AR_{it}}, \tag{14}$$

where AR_{it} and MC_{it} denote banks i's average revenue and marginal cost at time t respectively. AR_{it} measures the price of total assets, derived as total revenue/total assets while MC_{it} is the percentage change in total cost resulting from producing one more unit of output (see Eqn. 16). Following the work

[27] See also: Fung (2006), Mamatzakis et al., (2008), Weill (2009) and Matthews and Zhang (2010) which all studied banking convergence to assess the leveling effect of financial integration in various banking sectors.

of Koetter et al. (2008) and Sarpong-Kumamnkoma et al. (2017), the study estimates the following transcendental logarithmic (translog) cost function to derive marginal cost, MC_{ijt}:

$$\ln\left(\frac{TC_{it}}{W_{3i,t}}\right) = \alpha + \beta_1 \ln(Y_{it}) + \delta_1 \ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right) + \delta_2 \ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right) + \varphi_1 \ln(EQ_{i,t}) + \vartheta_1 \mathrm{T} + \beta_2 \frac{1}{2} [\ln(Y_{it})]^2 + \delta_3 \frac{1}{2}\left[\ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right)\right]^2 + \delta_4 \frac{1}{2}\left[\ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right)\right]^2 + \varphi_2 \frac{1}{2}[\ln(EQ)]^2 + \vartheta_2 \frac{1}{2} T^2 + \delta_5 \ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right) \ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right) + \varphi_3 \ln(EQ_{i,t}) T + \beta_3 \ln(Y_{it}) \ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right) + \beta_4 \ln(Y_{it}) \ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right) + \beta_5 \ln(Y_{it}) \ln(EQ_{i,t}) + \beta_6 \ln(Y_{it}) \mathrm{T} + \varepsilon_{i,t} \quad (15)$$

The above specification assumes that bank i's total costs in year t (TC_{it}) is a function of one standard bank output (Y_{it}) and three input prices W_1, W_2 and W_3 respectively. In line with Sarpong-Kumankoma et al. (2017), the study proxies for bank output by total assets while the input prices include price of labor (W_1), price of fixed assets (W_2) and price of funds (W_3). W_1 is computed as personnel expenses divided by total assets; W_2 as overhead expenses other than personnel expenses by the book value of fixed assets and W_3 as the ratio of total interest expenses to total borrowed funds. *'ln'* means take the natural logarithm of the variable in question. α, β, δ, φ, ϑ, and $\varepsilon_{i,t}$ are respective estimated parameters. T represents the deterministic time trend (Trend, T=Year-2006), capturing general time-related changes in technology (Berger et al., 2009; Andries and Capraru, 2014). Also, following Coccorese (2014), the study includes the equity capital (EQ_{it}) as an additional control to account for variations in bank risk appetite and the probability that it is used as a source of funding by a bank (Andries and Capraru, 2014; Coccorese 2014). Finally, following the convention in the empirical banking literature (Koetter, et al., 2012 and Coccorese, 2014), the study divides each factor price (W_1, W_2 and W_3), total cost (TC_{it}) by the price of funds (W_3) to impose homogeneity of degree one in the input and output prices.

Marginal cost (MC_{it}) is therefore estimated using the first derivative of the translog cost function with respect to output as follows:

$$\mathrm{MC_{it}} = \frac{TC_{it}}{y_{m,it}}\left[\beta_1 + \beta_2 \ln y_{m,it} + \beta_3 \ln\left(\frac{W_1}{W_3}\right) + \beta_4 \ln\left(\frac{W_2}{W_3}\right) + \beta_5 \ln(EQ) + \beta_6 \mathrm{T}\right] \quad (16)$$

where all variables assume the same meanings as in Equation 15 and the value of the Lerner index is interpreted as the market power of each bank in each year, with higher values denoting higher pricing power and lower competitive market conditions (Casu and Girardone, 2010).

The study employs the Stochastic Frontier Analysis (SFA) method of Aigner et al. (1977) to compute cost and profit efficiencies estimates for the sampled banks[28]. According to Debreu (1951), bank cost/profit efficiency measures the distance of its actual performance from a frontier which reflects the maximum possible output the firm can produce given a set of inputs and production technology[29] (Andries and Capraru, 2014). The cost function is specified as follows:

$$TC_{i,t} = f\left(Y_{k\,i,t}, W_{i,t}\right) + u_{i,t} + v_{i,t} \qquad (17)$$

where it $TC_{i,t}$ represents total cost of bank i at time t, $Y_{k\,i,t}$ and W_{it} are vectors of bank output and input prices respectively. In line with Sarpong-Kumankoma et al. (2017), both input and output variables take the same meanings as in Equation 15. This approach separates the error term into its two components, with $u_{i,t}$ corresponding to bank inefficiency while $v_{i,t}$ represents the random error term (with a mean of zero and a constant variance of σ_v^2). The profit efficiency frontier is estimated by replacing TC_{it} with a measure of bank i's after tax profits at time t (πli,t). However, since some banks in the study sample record negative profits for some years, the study opts for an estimation of the alternative profit frontier since it assumes an uncompetitive inputs market (Andries and Capraru, 2014). This transforms the dependent variable in the profit function from π_{it} to '$\pi + \min|\pi| + 1'$, where $\min|\pi|$ is the minimum absolute value of profit of bank 'i' over all banks in the sample.

The final specification of the transcendental logarithmic (translog) cost/profit function is modeled in line with the work of Koetter et al. (2008) and Sarpong-Kumankoma et al. (2017) as follows:

$$\begin{aligned}\ln\left(\frac{TC_{it}}{W_{3i,t}}\right) = {} & \alpha + \beta_1 \ln(Y_{it}) + \delta_1 \ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right) + \delta_2 \ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right) + \varphi_1 \ln\left(EQ_{i,t}\right) \\ & + \vartheta_1 \mathrm{T} + \beta_2 \frac{1}{2}\,[ln(Y_{it})]^2 + \delta_3 \frac{1}{2}\left[\ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right)\right]^2 + \delta_4 \frac{1}{2}\left[\ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right)\right]^2 \\ & + \varphi_2 \frac{1}{2}[\ln(EQ)]^2 + \vartheta_2 \frac{1}{2} T^2 + \delta_5 \ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right) \ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right) + \varphi_3 \ln\left(EQ_{i,t}\right) T \\ & + \beta_3 \ln(Y_{it}) \ln\left(\frac{W_{1i,t}}{W_{3i,t}}\right) + \beta_4 \ln(Y_{it}) \ln\left(\frac{W_{2i,t}}{W_{3i,t}}\right) + \beta_5 \ln(Y_{it}) \ln\left(EQ_{i,t}\right) \\ & + \beta_6 \ln(Y_{it})\,\mathrm{T} + u_{i,t} + v_{i,t} \qquad (18)\end{aligned}$$

[28] This financial intermediation approach is a widely used parametric method in the banking efficiency literature as it more accurately accounts for estimation errors and statistical noise by separating the random error from the inefficiency term (Aigner et al., 1977, Andries and Capraru, 2014; Sarpong-Kumankoma, et al., 2017).

[29] Inefficiency is therefore measured as the percentage reduction in inputs or expansion in outputs that will set the bank on the production possibility frontier.

Equation 18 follows the general model in equation 17, with all variables assuming the same definitions as in Equation 15. Trend, T accounts for time-specific effects; and the error term ($\varepsilon_{i,t}$) is divided into its two components ($\varepsilon_{i,t} = u_{i,t} + v_{i,t}$) to separate the random error term and the inefficiency term. Also, in estimating the profit efficiency frontier, the study replaces TC_{it} with '$\pi + \min|\pi| + 1$'. Equation 18 is implemented using Battese and Coelli (1995) model which allows us to in one step[30], estimate the African cost and profit frontiers while accounting for cross country differences in banking. According to Andries and Capraru (2014), this model produces more efficient and unbiased estimates since it accounts for country level variables that might influence variations in the efficiency of banks in each economy. The study follows the Battese and Coelli (1988) framework used in Andries and Capraru (2014) to estimate cost and profit efficiency as follows:

$$Eff \approx E\{\exp\left(\frac{u_{i,t}}{e}\right)\} \quad (19)$$

5.3.1 Financial integration and the evolution of bank competition and efficiency

In the second stage of the analysis, the chapter assesses the effectiveness of financial integration in levelling bank competition and efficiency in Africa's banking markets using β- and σ-convergence tests (Casu and Giradone, 2010). In line with Barro and Sala-i-Martin (1991), the study expects β-convergence to detect the catch-up effect of financial integration on bank competition and efficiency while σ-convergence is expected to detect reductions in disparities among countries in common market overtime (Sala-i-Martin, 1996). In line with Andries and Capraru (2014), the study test for β-convergence as follows:

$$\Delta\ln(Y_{j,t}) = \alpha + \beta\ln\left(Y_{j,t-1}\right) + \rho\Delta\ln(Y_{j,t-1}) + \varepsilon_{j,t} \quad (20)$$

where, $Y_{j,t}$ represents the mean value of the variable in question (competition, cost efficiency and profit efficiency respectively) for country j in year t. $Y_{j,t-1}$ is the mean value of the variable in question for country j in year t-1; $\Delta\ln(Y_{j,t}) = \ln\left(Y_{j,t}\right) - \ln\left(Y_{j,t-1}\right)$; α, β and ρ are parameters to be estimated while $\varepsilon_{j,t}$ is the error term. According to Barro and Sala-i-Martin (2004), β-convergence is absolute if initially poor performers increase their marginal performance at a faster rate than initially good

[30] The inefficiency effect $u_{i,t}$ is specified alongside the cost/profit estimation to account for bank industry and country specific variables affecting bank inefficiency. Specifically, the study estimates the following model of Andries and Capraru (2014): $u_{i,t} = \delta_0 + \delta_1 GDPPC_{j,t} + \delta_2 INF_{j,t} + \delta_3 FSD_{j,t} + \delta_4 CR5R_{j,t} + \delta_5 EQ_{i,t} + \varepsilon_{i,t}$. To account for the effect of GPD per capita (GDPPC), inflation rate (INF), domestic credit to domestic to private sector by banks (FSD), bank market concentration (CR5R) and bank capitalization (EQ).

performers to catch up with them. Therefore, in a univariate regression, a negative β value is interpreted as evidence of absolute β-convergence and higher relative coefficients indicate a greater probability for convergence and vice versa.

Following Casu and Girardone (2010) and Andries and Capraru (2014), the study estimates σ-convergence using the following equation:

$$\Delta W_{j,t} = \alpha + \sigma W_{j,t-1} + \rho \Delta W_{j,t-1}) + \varepsilon_{j,t} \quad (21)$$

where $W_{j,t} = \ln(Y_{j,t}) - \ln(\bar{Y}_t)$; $W_{j,t-1} = \ln(Y_{j,t-1}) - \ln(\bar{Y}_{t-1})$; Y_{it} and $Y_{it-1}$are defined as before in equation 8; $\bar{Y}_t$ respectively represents the mean level of the variables in question for the full sample and subsequently for the sub-regional samples in year t. $\bar{Y}_{t-1}$ is the value $\bar{Y}$ at time t-1; $\Delta W_{j,t} = W_{j,t} - W_{j,t-1}$; again α, σ and ρ are parameters to be estimated while $\varepsilon_{j,t}$ is the error term. A negative value of σ is interpreted as evidence of σ-convergence of variable $Y_{j,t}$ towards $\bar{Y}_t$ and larger values of |σ|<0 indicates a faster rate of σ-convergence in a comparative analysis. This measures the speed at which each country's competition and efficiency levels are converging to the African average. Following Casu and Girardone (2009), Equations 20 and 21 are estimated using both fixed and random effects models.

5.3.2 Causal nexus between competition and bank efficiency in Africa

To assess the causal nexus between competition and bank efficiency in Africa's banking markets, the study follows the works of Casu and Girardone (2009) to estimate the following panel vector autoregressive distributed linear (PVAR) specification:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{L} \alpha_k Y_{i,t-k} + \sum_{k=1}^{L} \beta_k X_{i,t-k} + u_i + v_{i,t} \quad (22)$$

where $Y_{i,t}$ and $X_{i,t-1}$are alternately represented by bank competition and cost efficiency[31] respectively for country i (i= 1…, N) in year t (t=L+1,..., T); and L represent optimal moment and model lags used, selected based on Andrews and Lu (2001) consistent model and moment selection criteria (MMSC) for

[31] Like time series VAR models, the study tested the unit root properties of the variables and they were stationary in levels for all samples, allowing us to conduct the Granger-causality test using the variables in levels. Besides, Sims (1980) argues that differencing data with small T and large N distorts crucial details about the co-movements among variables (Mora and Logan, 2011).

PVAR estimations based on Hansen's (1982) statistic of over-identifying restrictions[32]. α_0 is the intercept; $\alpha_k \text{and } \beta_k$ are estimated parameters. u_i is the bank-specific effect and $\upsilon_{i,t}$ is the disturbance term.

Equation 22 is implemented using Ordinary Least Squares (OLS), Fixed Effects (FE), Random Effects (RE) estimations as well as Generalized Method of Moments technique using the panel VAR approach (pVAR) of Hancock et al. (1995) with the help of the panel VAR estimator advanced by Love and Zicchino (2006) and Abrigo and Love (2016) for Stata. The panel VAR model follows Arellano and Bover (1995) to account for individual bank heterogeneity, while allowing untransformed lagged regressors to be used as instruments by forward mean differencing the variables of interest and estimating their coefficients by a system of general method of moments (Mora and Logan, 2011). The pVAR estimator of Abrigo and Love (2016) enables the study to in one step, test both the "Quiet-life" hypothesis and the "Efficient Structure" hypothesis of Demsetz (1973) by regressing each dependent variable on its own lags, lags of all other dependent regressors and lags of any exogenous variables used in the model (Abrigo and Love, 2016).

Following the literature, a significant joint null $\sum \beta_i$=0 is interpreted as evidence of Granger-causality in panel data and it is distributed as χ2 with two degrees of freedom and the sign of the joint null $\sum \beta_i$=0 denotes the direction of causality (Granger, 1969; Casu and Girardone, 2009; Andries and Capraru, 2014; Abrigo and Love, 2016). Therefore, in the efficiency equations, a negative and significant sum of the coefficients of lagged Lerner index ($(\sum Lerner_{t-i})$) is viewed as evidence in support of the Quiet-Life hypothesis because previous values of bank monopoly power negative Granger-causes bank cost efficiency. This suggests that banks with higher market power are not being efficient overtime. However, a positive and statistically significant sum of coefficients of lagged Lerner index ($(\sum Lerner_{t-i})$) is consistent with the rejection of the Quiet-life hypothesis since banks with higher monopoly power are deemed to be efficiently managing their operating costs (Casu and Girardone, 2009; Andries and Capraru, 2014). Similarly, for the competition equations, a positive and statistically significant sum of the coefficients of cost efficiency ($(\sum Efficiency_{t-i})$) is viewed as evidence of the "Efficient-Structure" hypothesis because higher cost efficiency would be preceding higher market power and vice versa (Schaeck and Cihak, 2008; Apergis and Polemis, 2016).

[32] The optimal lag is chosen where the MBIC, MAIC and MQIC are smallest and Hansen p-value is above 0.1 (Andrews and Lu, 2001; Abrigo and Love, 2016).

5.3.3 Data

The empirical analysis uses annual bank level data from the African banking sector. This comprises unconsolidated financial statement data from 405 banks in 47 Africa countries across five regional economic communities for the period 2007-2014. The bank level data was collected from unconsolidated financial statements of the 405 banks on the Bankscope database of *Bureau Van Dijk* (2015). As is the convention in the literature, despite the presence of many banks in Africa, the study was limited to banks which had annual financial statements on the Bankscope database for at least half of the study period, resulting in a total of 2834 bank-year observation. Macroeconomic data is sourced from the World Development Indicators (WDI) database of the World Bank Group (2016). Appendix A presents descriptive statistics of the input variables for the translog cost function used in estimating the Lerner index, cost and profit efficiency.

5.4 Results

Table 5.1 presents a summary of the descriptive statistics for the main variables of interest. This includes annual mean values of the Lerner index, cost efficiency and profit efficiency for the full sample and sub-regional samples. Both the Lerner index and efficiency scores were derived from the same model using the SFA approach. Overall, these scores are in line with scores reported by prior studies, especially on Africa economies. However, though banks in Africa seems to improve both cost and profit efficiency over the years, there is much room for cost efficiency improvements, especially in ECOWAS and EAC banking markets. Table 5.1 further shows that there has been a general improvement in bank competition in all five regional economic communities under study. The average Lerner index saw a gradual drop for all sub-regional markets. The full sample of 47 African states saw a decrease in bank Lerner index from 0.311 in 2007 to 0.243 in 2014, representing a 21.87 percent drop in bank market power. Also, the EAC has the least average 8-year average Lerner index (0.206), recording the lowest annual average Lerner index in all years under study. This is followed by ECOWAS (0.266), SADC (0.269), ECCAS (0.309) and AMU (0.347) respectively.

Cost efficiency among banks in Africa has also improved over the 2007-2014 period, starting at an average of 0.558 in 2007 to an average of 0.767 in 2014. However, the AMU sub-region recorded the highest average cost efficiency scores (0.877) over the 2007-2014 period, starting at an average cost efficiency score of 0.852 in 2007 to an average of 0.966 in 2014. This is followed by SADC, with a 2007 average cost efficiency score of 0.592, rising to an average of 0.802 in 2014 and an 8-year average of 0.706. ECCAS followed with 2007 average cost efficiency score of 0.586, a 2014 average cost

efficiency of 0.711 and an 8-year average of 0.646. ECOWAS (0.633) and EAC (0.511) lagged in terms of bank cost efficiency.

Similarly, bank profit efficiency has gradually improved over the 8 years under study, with Africa recording average profit efficiency scores of 0.933 in 2007 and improving this to 0.978 in 2014, with a 2007-2014 average of 0.958. Again, AMU banks showed greater profit efficiency than banks in the other regional blocs, starting at an average score of 0.998 in 2007 to an average of 1.000 in 2014, an 8-year average score of 0.99 9 profit efficiency score. The SADC region followed suit, starting with an average of 0.944 in 2007 to 0.987 in 2014, recording an 8-year average profit efficiency score of 0.964. ECOWAS followed with an 8-year average of 0.961 and EAC (0.941) and ECCAS (0.924) lagged the rest.

Table 5.1: Evolution of bank market power, cost and profit efficiency in Africa and 5 RECs

Variable	Region	2007	2008	2009	2010	2011	2012	2013	2014	Total
Lerner	Africa	0.311	0.302	0.270	0.265	0.265	0.247	0.246	0.243	0.267
	AMU	0.342	0.368	0.375	0.353	0.338	0.333	0.350	0.302	0.347
	EAC	0.275	0.274	0.224	0.235	0.207	0.148	0.155	0.141	0.206
	ECCAS	0.410	0.335	0.348	0.304	0.290	0.257	0.268	0.302	0.309
	ECOWAS	0.306	0.315	0.264	0.259	0.251	0.241	0.239	0.253	0.266
	SADC	0.303	0.277	0.255	0.245	0.280	0.286	0.263	0.257	0.269
Cost Eff.	Africa	0.558	0.585	0.623	0.661	0.678	0.689	0.747	0.767	0.664
	AMU	0.852	0.853	0.865	0.853	0.866	0.873	0.940	0.966	0.877
	EAC	0.417	0.438	0.463	0.499	0.507	0.530	0.593	0.627	0.511
	ECCAS	0.586	0.557	0.599	0.634	0.674	0.681	0.684	0.711	0.646
	ECOWAS	0.503	0.524	0.553	0.621	0.658	0.679	0.827	0.775	0.633
	SADC	0.592	0.652	0.709	0.689	0.716	0.726	0.743	0.802	0.706
Profit Eff.	Africa	0.933	0.946	0.951	0.961	0.962	0.964	0.970	0.978	0.958
	AMU	0.998	0.999	0.997	0.998	0.999	0.999	1.000	1.000	0.999
	EAC	0.903	0.922	0.931	0.942	0.937	0.949	0.964	0.971	0.941
	ECCAS	0.934	0.914	0.923	0.927	0.919	0.921	0.927	0.931	0.924
	ECOWAS	0.926	0.949	0.944	0.959	0.970	0.975	0.989	0.984	0.961
	SADC	0.944	0.960	0.955	0.964	0.969	0.966	0.965	0.987	0.964

Notes: Eff. and LI denote bank efficiency and Lerner Index respectively. High relative values of the Lerner index (Lerner) imply less competition and lower relative values indicate higher competition in the banking system. Also, the benchmark for both profit and cost efficiency is 100% (1.00).

5.4.1 Regression results

Tables 5.2 to 5.4 present β-convergence and σ-convergence tests results respectively for bank competition, cost efficiency and profit efficiency in Africa and the five sub-regional markets for the 2007-2014 period using both Fixed and Random Effects regressions. In Table 5.2, the study finds a negative and statistically significant β-coefficient for all samples in both models. This suggests that bank

competition convergence has occurred in Africa and all five sub-regional banking markets. This shows that for the 2007-2014 periods, countries with initially lower competition in 2007 improved their competitiveness faster than those with initially higher competition levels to catch-up with the initially better performers among all 47 African countries and in each sub-regional market. Also, from a comparative perspective, the absolute value of the coefficient of beta shows that AMU banking sector had the greatest speed of β-convergence (1.429). This was followed by the ECCAS region (0.726), SADC (0.635), ECOWAS (0.358) and EAC (0.244) respectively. This could be because the EAC banking sector recorded the highest average level of bank competition, with the lowest Lerner index values.

Sigma (σ) convergence of bank competition is reported in the second half of Table 5.2. The results show that σ-convergence occurred in Africa and in all sub-regional markets. This is in line with the literature as β-convergence is a necessary (though not a sufficient) condition for the occurrence of σ-convergence (Sala-i-Martin, 2004). In this case, σ-convergence measures the rate at which country average Lerner indices ($LI_{i,j}$) converge towards the African average Lerner index ($\overline{LI}_t$), with higher relative absolute values showing faster rate of convergence and vice versa. Again, Table 5.2 shows that the AMU has the fastest rate of sigma convergence in Africa (1.281), followed by ECCAS (0.870), SADC (0.606), ECOWAS (0.321) and EAC (0.310) respectively.

These findings suggest that though AMU records the highest levels of bank market power in Africa, its country level market power scores are converging faster in this region than in other regions. Also, the AMU banking industry Lerner indices of market power are converging faster towards the African average than other sub-regional banking markets. The EAC banking sector which leads Africa in terms of banking competition lags the other regions in both β and σ convergence because bank Lerner index measures bank monopoly power. Table 5.3 shows that for the 2007-2014 period, both β and σ cost efficiency convergence occur across Africa and in all five sub-regional banking markets studied. The evidence of βeta cost efficiency convergence indicates the catching-up of initially poor performing countries banking firms with those that were initially performing well in each sample. The results further show that the AMU banking sector records the fastest βeta cost efficiency convergence (0.992). This is followed by the ECOWAS banking sector with a β-coefficient of 0.357, SADC (0.326), ECCAS (0.233) and EAC (0.052). However, though the AMU banking sector recorded the fastest β cost efficiency convergence, it lags all the other sub-regional banking markets in terms of σ cost efficiency convergence (0.259). The ECOWAS region recorded the fastest σ cost efficiency convergence rate of 0.472, followed by SADC (0.471) ECCAS (0.470) and the EAC (0.311).

Table 5.2: Convergence of bank competition across sub-regional markets

	β-Convergence											
Region	**Africa**		**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
α	**-0.595*** **	**-0.257*** **	**-1.454*** **	**-0.165*** **	**-0.525*** **	**-0.604*** **	**-0.935*** **	**-0.608*** **	**-0.550*** **	**-0.316*** **	**-0.869*** **	**-0.377*** **
	(0 .038)	(0.025)	(0.062)	(0.034)	(0.072)	(0.072)	(0.120)	(0.110)	(0.081)	(0.053)	(0.069)	(0.045)
β	**-0.401*** **	**-0.155*** **	**-1.429*** **	**-0.147*** **	**-0.244*** **	**-0.306*** **	**-0.726*** **	**-0.474*** **	**-0.358*** **	**-0.191*** **	**-0.635*** **	**-0.274*** **
	(0 .028)	(0.018)	(0.062)	(0.032)	(0.046)	(0.046)	(0.100)	(0.091)	(0.058)	(0.037)	(0.051)	(0.032)
ρ	**-0.173*** **	**-0.137*** **	**0.154*** **	-0.021	-0.025	**0.173*** **	**0.563*** **	**0.566*** **	**-0.304*** **	**-0.147** **	0 .059	-0.025
	(0.027)	(0.025)	(0.033)	(0.047)	(0.056)	(0.054)	(0.147)	(0.136)	(0.060)	(0.058)	(0.047)	(0.044)
R-Square	0.2441	0.2377	0.6749	0.5632	0.1273	0.0954	0.2925	0.2384	0.2100	0.2099	0.3392	0.3298
F-stat/ Wald X^2	**287.29*** **	**190.44*** **	**278.13*** **	**22.93*** **	**28.38*** **	**46.86*** **	**31.63*** **	**27.26*** **	**58.90*** **	**44.35*** **	**97.54*** **	**83.92*** **
	σ-Convergence											
	Africa		**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
α	**-0.021** **	**-0.010**	**0.429*** **	**0.073*** **	**-0.176*** **	**-0.185*** **	**0.058***	0.040	0.060	-0.019	0.010	**0.023** **
	(0.007)	(0.007)	(0.019)	(0.015)	(0.019)	(0.019)	(0.031)	(0.033)	(0.015)	(0.017)	(0.011)	(0.011)
σ	**-0.417*** **	**-0.150*** **	**-1.281*** **	**-0.171*** **	**-0.310*** **	**-0.387*** **	**-0.870*** **	**-0.516*** **	**-0.321*** **	**-0.172*** **	**-0.606*** **	**-0.283*** **
	(0.029)	(0.018)	(0.055)	(0.032)	(0.054)	(0.052)	(0.111)	(0.100)	(0.058)	(0.036)	(0.046)	(0.031)
ρ	**-0.155*** **	**-0.134*** **	**0.092** **	0.009	0.074	**0.285*** **	**0.707*** **	**0.598*** **	**-0.314*** **	**-0.141** **	0.056	-0.012
	(0.028)	(0.025)	(0.032)	(0.047)	(0.062)	(0.058)	(0.155)	(0.144)	(0.061)	(0.059)	(0.011)	(0.044)
R-Square	0.2409	0.2322	0.6706	0.6699	0.1182	0.0882	0.3250	0.2702	0.1933	0.1928	0.3518	0.3469
F-stat./Wald X^2	282.26***	**177.53*** **	**272.85*** **	**28.76*** **	**26.06*** **	**55.41*** **	**36.83*** **	**27.03*** **	**53.09*** **	**37.31*** **	**103.12*** **	**90.93*** **

Notes: *, **, *** respectively indicate significance at the 10%, 5% and 1% levels.

Table 5.3: Convergence of bank cost efficiency

	β-Convergence											
Region	**Africa**		**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
α	**-0.070*** **	**0.009*** **	**-0.124*** **	**0.010*** **	**0.031** **	**0.051*** **	**-0.091*** **	**-3.59e-4**	**-0.123*** **	0.010	**-0.079*** **	**0.010***
	(0.006)	(0.002)	(0.006)	(0.003)	(0.014)	(0.007)	(0.018)	**(0.005)**	(0.012)	(0.007)	(0.015)	(0.006)
β	**-0.253*** **	**-0.065*** **	**-0.992*** **	**-0.015***	**-0.052** **	**-0.025** **	**-0.233*** **	**-0.074*** **	**-0.357*** **	**-0.066*** **	**-0.326*** **	**-0.075*** **
	(0.013)	(0.004)	(0.043)	(0.009)	(0.019)	(0.010)	(0.031)	**(0.007)**	(0.025)	(0.010)	(0.038)	(0.011)
ρ	**-0.067*** **	0.008	**0.101*** **	**0.076***	**-0.141*** **	**-0.162*** **	**0.143** **	0.068	-0.067	0.014	**-0.134** **	0.013
	(0.021)	(0.019)	(0.027)	(0.043)	(0.041)	(0.037)	(0.053)	(0.048)	(0.043)	(0.045)	(0.048)	(0.049)
R-Square	0.2178	0.2060	0.6965	0.0162	0.0531	0.0480	0.2729	0.2655	0.4012	0.3803	0.2599	0.2143
F-stat./Wald X^2	**206.69*** **	**336.82*** **	**266.23*** **	**4.29**	**10.74*** **	**24.47*** **	**29.65*** **	**114.34*** **	**103.84*** **	**47.86*** **	**47.59*** **	**44.28*** **
	σ-Convergence											
	Africa		**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
α	**-0.016*** **	**-0.008*** **	**0.041*** **	**-0.026*** **	**-0.073*** **	**0.008** **	**-0.067*** **	**-0.012** **	**-0.029*** **	**-0.007**	**0.006**	**-0.003**
	(0.001)	(0.002)	(0.012)	(0.005)	(0.016)	(0.004)	(0.008)	(0.004)	(0.004)	(0.005)	(0.003)	(0.004)
σ	**-0.384*** **	**-0.067*** **	**-0.259*** **	**-0.019** **	**-0.311*** **	**-0.027** **	**-0.470*** **	**-0.075*** **	**-0.472*** **	**-0.059*** **	**-0.471*** **	**-0.078*** **
	(0.021)	(0.004)	(0.038)	(0.010)	(0.055)	(0.011)	(0.053)	(0.009)	(0.042)	(0.011)	(0.071)	(0.013)
ρ	-0.003	-0.019	-0.008	0.028	**-0.087** **	**-0.177*** **	**0.262*** **	0.063	0.013	0.011	0.018	-0.017
	(0 .022)	(0.019)	(0.048)	(0.046)	(0.042)	(0.036)	(0.057)	(0.052)	(0.045)	(0.045)	(0.063)	(0.049)
R-Square	0.2037	0.1931	0.1683	0.0585	0.1186	0.0559	0.3399	0.3166	0.2933	0.2867	0.2031	0.1955
F-stat./Wald X^2	**189.98*** **	**286.46*** **	**23.48*** **	**3.93**	**25.76*** **	**28.57*** **	**40.67*** **	**82.31*** **	**64.32*** **	**29.29*** **	**34.54*** **	**39.02*** **

Notes: *, **, *** respectively indicate significance at the 10%, 5% and 1% levels.

Table 5.4: Convergence of bank profit efficiency

	β-Convergence											
Region	**Africa**		**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
α	**-0.008*** **	**0.001*** **	**0.001*** **	3.21e-5	**-0.007*** **	6.54e-5	**-0.146*** **	5.32e-5	**0.003***	2.04e-4	**-0.026*** **	-1.18e-4
	(0.001)	(2.81e-4)	(0.000)	(8.33e-5)	(0.001)	(0.001)	(0.011)	(5.32e-5)	(0.002)	(0.001)	(0.003)	(0.001)
β	**-0.284*** **	**-0.047*** **	**0.032**	**-0.284*** **	**-0.301*** **	**-0.178*** **	**-1.657*** **	**-0.025*** **	-0.024	**-0.107*** **	**-0.568*** **	**-0.020***
	(0.019)	(0.004)	(0.070)	(0.020)	(0.020)	(0.009)	(0.123)	(0.006)	(0.052)	(0.009)	(0.070)	(0.012)
ρ	**-0.041** **	**0.047** **	**-0.660*** **	**-0.464*** **	**-0.197*** **	**-0.141*** **	**0.824*** **	-0.076	**-0.236*** **	**-0.211*** **	**0.265*** **	0.062
	(0.019)	(0.018)	(0.055)	(0.034)	(0.029)	(0.027)	(0.087)	(0.071)	(0.037)	(0.031)	(0.058)	(0.050)
R-Square	0.1327	0.0427	0.5168	0.4734	0.3829	0.3788	0.5376	0.0307	0.1276	0.1204	0.1988	0.0223
F-stat./Wald X^2	**113.56*** **	**205.99*** **	**124.07*** **	**300.34*** **	**118.81*** **	**400.01*** **	**91.84*** **	**17.18*** **	**22.67*** **	**160.58*** **	**33.63*** **	**5.63***
	σ-Convergence											
	Africa		**AMU**		**EAC**		**ECCAS**		**ECOWAS**		**SADC**	
α	**-0.002*** **	**-0.002*** **	**1.68e-4**	**0.001**	**-0.005*** **	**0.001**	**-0.026*** **	**-0.005*** **	**-0.001**	**-0.002*** **	**-0.006*** **	**-0.005*** **
	(0.000)	(2.49e-4)	(0.001)	(0.001)	(0.001)	(3.63e-4)	(0.003)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
σ	**-0.408*** **	**-0.048*** **	**-0.179*** **	**-0.195*** **	**-0.534*** **	**-0.180*** **	**-0.495*** **	**-0.025*** **	**-0.321*** **	**-0.102*** **	**-0.626*** **	**-0.026** **
	(0.023)	(0.004)	(0.030)	(0.027)	(0.026)	(0.010)	(0.071)	(0.006)	(0.068)	(0.010)	(0.076)	(0.012)
ρ	**0.039***	**0.067*** **	**-0.299*** **	**-0.286*** **	**-0.124*** **	**-0.102*** **	0.073	-0.068	-0.028	**-0.091** **	**0.277*** **	0.017
	(0.021)	(0.019)	(0.054)	(0.049)	(0.027)	(0.030)	(0.071)	(0.068)	(0.047)	(0.038)	(0.063)	(0.051)
R-Square	0.1764	0.0422	0.1671	0.1655	0.5297	0.4816	0.2409	0.0478	0.0870	0.0630	0.1998	0.1782
F-stat./Wald X^2	**158.98*** **	**202.09*** **	**23.27*** **	**60.64*** **	**215.72*** **	**347.92*** **	**25.07*** **	**20.04*** **	**14.77*** **	**109.38*** **	**33.84*** **	**4.74*** **

Notes: *, **, *** respectively indicate significance at the 10%, 5% and 1% levels.

Regarding the convergence of bank profit efficiency, Table 5.4 shows Africa has a β profit efficiency rate of 0.284 and σ profit efficiency convergence rate of 0.408. The results further show that profit efficiency convergence occurs in all sub-regional markets, with the ECCAS banking sector recording the fastest rate of β-convergence (1.657), followed by the SADC (0.568), EAC (0.301), AMU (0.032) and ECOWAS (0.024) banking markets respectively. However, the SADC region led the sub-regional banking markets in terms of bank σ cost efficiency convergence, with a rate of 0.626. This was respectively followed by the EAC (0.534), ECCAS (0.495), ECOWAS (0.321) and AMU (0.179) banking markets.

Tables 5.5 and 5.6 present results for the Granger causality and reverse causality tests between bank competition and cost efficiency using various estimation techniques. In Table 5.5, the study presents the results of the fixed effects and random effects models while Table 5.6 presents the results of the panel least squares and pVAR (GMM) models. The results of the F statistics, Wald chi and Hansen J test respectively for the fixed effects, random effects and GMM models show that all models were correctly specified. The first parts of Tables 5.5 and 5.6 presents the results of the Granger-causality test running from bank competition, proxied by bank Lerner index, to cost efficiency while the reverse causality test results are displayed in the second part of each table. The results on the first halves of both Table 5.5 and Table 5.6 show that the first lags of bank cost efficiency in all samples are statistically significant for the competition-efficiency Granger-causality test, indicating that bank cost efficiency at time t is affected by cost efficiency in previous years. Similarly, the second half of both Tables 5.5 and 5.6 show that previous years' competition influenced competition at time t in all samples. As indicated earlier, Granger-causality is assumed when the joint test of significance ($\beta_1 + \beta_2 = 0$) of the two lags of the independent variable has a p-value of less than ten percent ($\rho<0.10$), in which case, the study rejects, at the 10 percent significance level, the null hypothesis of no causality (Casu and Girardone, 2009; Andries and Capraru, 2014).

The results on Table 5.5 suggest that market power negatively Granger-causes bank cost efficiency in the full sample including all 47 African countries and in the EAC banking sector, but positively Granger-causes bank cost efficiency in the AMU and ECCAS banking industries. This is because, the sum of the coefficients of the two lags of Lerner index ($\sum Lerner$) is positive and the test of their joint significance ($\sum \beta_i = 0$) is jointly different from zero and has a p-value of 0.019 for the full sample and 0.027 for the EAC banking industry. Also, the sum of the coefficients of the two lags of Lerner index ($\sum Lerner$) is negative and their test of joint significance ($\sum \beta_i = 0$) is also significantly different from zero and has a p-value of 0.005 for the AMU sample and 0.031 for the ECCAS sample. This suggests that the reduction in bank market power recorded over the 2007-2014 period (see Table 5.1) has a significant positive effect on bank cost efficiency in Africa, especially in the East African Community.

Table 5.5: Causal nexus between bank market power and cost efficiency by REC: Fixed and Random Effects

		Africa		AMU		EAC		ECCAS		ECOWAS		SADC	
		FE	RE	FE	RE	FE	RE	FE	RE	FE	RE	FE	RE
Cost Efficiency	Cost Eff_{t-1}	**0 .660*** **	**1.045*** **	0 .167	**1.093*** **	**0 .836*** **	**1.065*** **	**0 .826*** **	**1.289*** **	**0 .539*** **	**0 .949*** **	**0 .578*** **	**1.004*** **
		(0.031)	(0.027)	(0.134)	(0.098)	(0.054)	(0.051)	(0.086)	(0.062)	(0.067)	(0.061)	(0.067)	(0.061)
	Cost Eff_{t-2}	0.036	**-0.094*** **	**-0.345*** **	**-0.165***	0.023	-0.068	-0.102	**-0.328*** **	**0 .116***	-0.015	0 .008	-0.073
		(0.029)	(0.027)	(0.098)	(0.095)	(0.059)	(0.052)	(0.067)	(0.061)	(0.060)	(0.059)	(0.064)	(0.060)
	$Lerner_{t-1}$	**-0.058*** **	-0.016	**0 .102***	0 .037	**-0.075** **	**-0.043***	-0.024	0.013	-0.016	3.11e-4	0.008	0.056
		(0.018)	(0.015)	(0.062)	(0 .056)	(0.026)	(0.022)	(0.034)	(0.027)	(0.044)	(0.039)	(0.058)	(0.046)
	$Lerner_{t-2}$	0.013	0.013	0.078	-0.020	0.010	0.018	**0.063** **	0.024	-0.019	-0.023	-0.029	**-0.077***
		(0.016)	(0.015)	(0.055)	(0 .055)	(0.024)	(0.021)	(0.031)	(0.027)	(0.041)	(0.040)	(0.047)	(0.046)
$\sum Lerner$		**-0.045**	-0.003	**0.180**	0.017	**-0.065**	-0.025	0.039	**0.037**	-0.035	-0.023	-0.021	-0.021
Test of $\sum \beta_i = 0$		**0.019**	0.650	**0.005**	0.500	**0.027**	0.114	0.321	**0.031**	0.421	0.295	0.714	0.3185
R Square		0.555	0.545	0.148	0.003	0.729	0.723	0.722	0.701	0.544	0.532	0.423	0.421
F-Test/Wald X^2		301.28***	31142.76***	3.86**	1962.05***	196.62***	9625.61***	66.85***	6909.15***	57.76***	3991.44***	38.33***	4153.62***
Lerner index	$Lerner_{t-1}$	**0 .364*** **	**0 .681*** **	**0 .517** **	**0 .886*** **	**0 .342*** **	**0 .527*** **	**0 .509*** **	**0 .868*** **	**0 .385*** **	**0 .722*** **	**0 .420*** **	**0 .864*** **
		(0.029)	(0.025)	(0.137)	(0.112)	(0.050)	(0.046)	(0.079)	(0.067)	(0.059)	(0.055)	(0.073)	(0.055)
	$Lerner_{t-2}$	0.020	**0.122*** **	-0.204	-0.088	-0.032	**0.083***	-0.090	-0.044	0.039	**0.116*** **	-0.025	0.042
		(0.026)	(0.025)	(0.125)	(0.107)	(0.047)	(0.044)	(0.072)	(0.066)	(0.057)	(0.056)	(0.060)	(0.055)
	Cost Eff_{t-1}	0.034	**0.103*** **	-0.003	0.338	-0.012	0.107	-0.113	0.159	0.071	0.019	**0.185*** **	**0 .142***
		(0 .051)	(0.047)	(0.299)	(0.194)	(0.106)	(0.105)	(0.202)	(0.158)	(0.094)	(0.089)	(0.082)	(0.075)
	Cost Eff_{t-2}	-0.055	-0.051	0.042	**-0.270***	**-0.247** **	-0.034	0.076	-0.014	0.048	-0.010	**-0.179*** **	-0.109
		(0 .048)	(0.046)	(0.218)	(0.187)	(0.115)	(0.109)	(0.156)	(0.154)	(0.084)	(0.086)	(0.082)	(0.073)
$\sum Efficiency$		-0.021	**0.052**	0.039	0.068	**-0.259**	**0.073**	-0.037	0.145	0.119	0.009	0.006	0.033
Test of $\sum \beta_i = 0$		0.532	**0.000**	0.893	0.156	**0.000**	**0.030**	0.724	0.654	0.054	0.735	0.920	0.060
R Square		0.165	0.161	0.139	0.120	0.211	0.154	0.289	0.276	0.236	0.222	0.182	0.172
F-Test/ Wald X^2		49.15***	2561.12***	3.75**	232.82***	19.63***	268.79***	10.48***	434.55***	16.04***	610.63***	12.27***	1405.91***

Note: *, **, *** indicate significance at the 10%, 5% and 1% levels. Robust standard errors are in parenthesis. FE and RE denote fixed and random effects estimations respectively.

Table 5.6: Causal nexus between bank market power and cost efficiency by REC: OLS and GMM

		Africa		AMU		EAC		ECCAS		ECOWAS		SADC	
		OLS	PVAR	OLS	PVAR	OLS	PVAR	OLS	PVAR	OLS	PVAR	OLS	PVAR
Cost Efficiency	Cost Eff_{t-1}	**1.045*** **	**1.127*** **	**1.103*** **	**1.279*** **	**1.065*** **	**1.056** **	**1.289*** **	**0.950*** **	**0 .949*** **	**0.921*** **	**1.004*** **	**1.301*** **
		(0.027)	(0.091)	(0.096)	(0.173)	(0.051)	(0.474)	(0.062)	(0.224)	(0.061)	(0.143)	(0.061)	(0.205)
	Cost Eff_{t-2}	**-0.094*** **	-0.084	**-0.170***	**-0.412** **	-0.068	0.026	**-0.328*** **	**-0.230***	-0.015	-0.084	-0.073	-0.122
		(0.027)	(0.062)	(0.094)	(0.164)	(0.052)	(0.153)	(0.061)	(0.140)	(0.059)	(0.139)	(0.060)	(0.115)
	$Lerner_{t-1}$	-0.016	0.075	0 .038	-0.094	**-0.043***	0.010	0.013	0.017	3.11e-4	0.224	0.056	0.291
		(0 .015)	(0.063)	(0.055)	(0.156)	(0.022)	(0.053)	(0 .027)	(0.084)	(0.039)	(0.227)	(0.046)	(0.211)
	$Lerner_{t-2}$	**0 .013**	**0.052***	-0.025	**0.112***	0.018	0.038	0 .024	**0.112** **	-0.023	0.043	-0.077*	-0.057
		(0 .015)	(0.030)	(0.054)	(0.060)	(0.021)	(0.042)	(0 .027)	(0.040)	(0.040)	(0.068)	(0.046)	(0.066)
$\sum Lerner$		-0.003	0.127	0.013	0.018	-0.025	0.048	**0.037**	**0.129**	-0.023	0.267	-0.021	0.234
Test of $\sum \beta_i = 0$		0.650	0.181	0.566	0.140	0.115	0.672	**0.033**	**0.017**	0.296	0.597	0.319	0.315
R Squared		0.961		0.951		0.963		0.981		0.938		0.940	
Adj. R Square		0.961		0.950		0.963		0.981		0.937		0.939	
F-Test/Wald X^2		7785.69***		615.92***		2406.40***		1727.29***		997.86***		1038.40***	
Hansen J.: P-value			0.787		0.643		0.456		0.500		0.227		0.219
Lerner index	$Lerner_{t-1}$	**0 .758*** **	**0.659*** **	**0 .990*** **	**1.098** **	**0.630*** **	**0.540*** **	**0 .909*** **	**0.641*** **	**0 .802*** **	**0.590***	**0 .864*** **	**0.984*** **
		(0.025)	(0.086)	(0 .114)	(0.492)	(0.047)	(0.105)	(0.066)	(0.201)	(0.056)	(0.320)	(0.055)	(0.181)
	$Lerner_{t-2}$	**0.100*** **	0.082	-0.145	-0.106	**0.103** **	0.042	-0.057	-0.059	0 .088	0.021	0.042	0.022
		(0.025)	(0.054)	(0 .109)	(0.184)	(0.046)	(0.089)	(0.066)	(0.050)	(0.056)	(0.098)	(0.055)	(0.081)
	Cost Eff_{t-1}	**0.120** **	-0.066	**0 .394** **	0.430	0.126	-0.190	0.192	0.555	0.034	0.108	**0.142***	0.116
		(0.048)	(0.140)	(0 .198)	(0.362)	(0.108)	(0.696)	(0.154)	(0.419)	(0.090)	(0.257)	(0.075)	(0.305)
	Cost Eff_{t-2}	-0.074	0.003	**-0.351***	-0.174	-0.041	0.009	-0.181	-0.159	-0.034	0.022	-0.109	-0.137
		(0.046)	(0.063)	(0 .193)	(0.393)	(0.111)	(0.170)	(0.152)	(0.165)	(0.087)	(0.135)	(0.073)	(0.115)
$\sum Efficiency$		**0.046**	-0.063	0.043	**0.256**	**0.256**	-0.181	0.011	-0.396	0.000	0.130	**0.033**	-0.021
Test of $\sum \beta_i = 0$		**0.000**	0.876	0.252	**0.069**	**0.000**	0.960	0.727	0.414	0.999	0.847	**0.061**	0.475
R Squared		0.758		0.742		0.630		0.817		0.760		0.835	
Adj. R Square		0.757		0.734		0.626		0.811		0.756		0.833	
F-Test/ Wald X^2		1017.91***		94.77***		157.77***		145.99***		221.16***		351.48***	
Hansen: P-value			0.787		0.643		0.456		0.500		0.227		0.219

Note: *, **, *** indicate significance at the 10%, 5% and 1% levels. Robust standard errors are in parenthesis. OLS and PVAR denote panel least squares and panel vector autoregressive models respectively. Hansen is the Hansen J test of over-identifying restrictions for the PVAR/GMM model.

However, the results on the AMU and ECCAS banking sectors suggest that increases in bank market power has a significant positive effect on bank cost efficiency and the increases in bank competition in these regions over the 2007-2014 period has a significant negative effect on bank cost efficiency. The findings are consistent with earlier studies by Casu and Girardone (2009) Andries and Capraru (2014) and Sarpong-Kumankuma et al (2017). However, while the results of the full sample of 47 African countries and EAC sample support the 'Quiet-life' hypothesis of Hicks (1935), the evidence from the AMU and ECCAS banking sectors rejects the 'Quiet-life' hypothesis, as increases in bank monopoly power positively Granger-causes cost efficiency in these sub-regions[33].

The second half of Tables 5.5 and 5.6 presents the results of the test of reverse causality from bank cost efficiency to competition. The evidence shows that cost efficiency positively Granger-causes bank market power for the full sample of 47 African countries and in the AMU and SADC banking markets. However, the results from the EAC show sensitivity to model selection. This finding suggests that for Africa, especially the AMU and SADC banking industries, an improvement in bank cost efficiency enhances bank monopoly power, providing evidence in support of the 'Efficient Structure' hypothesis of Demsetz (1973).

Overall, the results provide empirical evidence of the dynamic nature of African banking markets, especially across the various rucks of banking market integration projects (RECs) in the region. Generally, the results from the evolution and convergence analysis show that the pursuit of banking integration has helped reduce variations in the competitiveness and efficiency of banks across all African banking markets. However, the Granger-causality test show that the various sub-regional banking markets are unique, with the evidence supporting the 'Quiet-Life' hypothesis in the full sample and EAC, while rejecting the 'Quiet-Life' hypothesis in the AMU and ECCAS sub-regional banking markets. Also, the results support the 'Efficient Structure' hypothesis in the full sample, AMU and SADC banking markets.

5.5 Conclusions

Several significant issues emerge from the empirical investigation in this chapter. First, the findings suggest that the period 2007-2014 saw a significant reduction in bank market power and a gradual rise in bank competition in Africa and five regional economic communities. Also, the convergence of

[33] Table 5.1 shows these banking markets are invariably the least competitive in the continent. This could mean that sign (+/-) of the effect of bank competition on cost efficiency depends on the level of competition in the region under study.

competition and bank cost and profit efficiency in all African banking markets provides evidence of the positive benefits of financial integration for banking sector harmonization. The findings support the 'Quiet-life' hypothesis in Africa, especially in the EAC banking market. However, the 'Quiet-life hypothesis is rejected in the AMU and ECCAS sub-regional banking markets. Also, the results of reverse causality running from cost efficiency to bank competition suggest that increases in bank cost efficiency promotes bank monopoly power in Africa, especially in AMU and SADC banking markets. These findings provide evidence of the uniqueness of the causal nexus between bank competition and bank efficiency in Africa, especially among the sub-regional banking markets.

These findings have implications for policy makers in Africa. First, the results suggest that financial integration has a generally positive effect on bank competition and cost efficiency. This provides incentive for the continuous promotion of financial integration in Africa. However, the variations in the convergence rates of bank competition and efficiency indicate the need for increased financial integration efforts in sub-regional banking markets with slower rates of β and σ convergence to bring their competition and efficiency convergence levels at par with the other sub-regions. This will help promote greater harmony among African banking markets and pave the way for broader banking integration in Africa and greater distributive efficiency. Similarly, the evidence of variations in the causal nexus between bank competition and cost efficiency suggest that tailor-made initiatives and policies need to be adopted depending on the nature of the relationship in each sub-regional banking market rather than whole-sale initiatives. This will ensure the optimization of the competition and efficiency benefits of banking integration in Africa.

References

Abrigo, M. R. M. and Love, I. (2016). Estimation of panel vector autoregression in Stata. *The Stata Journal*, 16, (3), 778–804

Affinito, M. (2011). Convergence clubs, the Euro-area rank and the relationship between banking and real convergence. *Bank of Italy Temi di discussione (Working Paper)* No. 809.

Aigner, D. J., Lovell, C. A. K. and Schmidt, P. (1977). Formulation and estimation of stochastic frontier production function models. *Journal of Econometrics*, 6(1), 21-37.

Ajisafe, R. A. and Akinlo, A. E. (2014). Competition and Efficiency of Commercial Banks: An Empirical Evidence from Nigeria. *American Journal of Economics*, 4(1), 18-22

Andrews D. W. K and Lu, B. (2001). Consistent model and moment selection procedures for GMM estimation with application to dynamic panel data models. *Journal of Econometrics*, 101, 123-164.

Andries¸ A. M. and Ca˘praru, B. (2012). Competition and efficiency in EU27 banking systems. *Baltic Journal of Economics*, 12(1), 41–60.

Andries, A. M. and Capraru, B. (2014). The nexus between competition and efficiency: The European banking industries experience. *International Business Review*, 23(3), 566-579.

Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68, 29–51

Ali, M. S. B. and Sghaier, A. (2012). Competition and Banking Efficiency: Evidence from Tunisian Banking Industry. *Journal of Islamic Economics, Banking and Finance*, 8(1), 53-70

Apergis, N. and Polemis, M.L. (2016). Competition and efficiency in the MENA banking region: A non-structural DEA approach. *Applied Economics,* 10, 1–16.

Barro, R. and Sala-i-Martin, X. (1991). Convergence across states and regions. *Brookings Papers on Economic Activity*, 1, 107–182.

Barro, R. and Sala-i-martin, X. (2004). Economic growth. Cambridge, MA: *MIT Press*

Battese G. E. and Coelli, T. (1988). Prediction of firm-level technical efficiencies with a generalized frontier production function and panel data. *Journal of Econometrics*, 38(3), 387-399

Battese, G. E. and Coelli, T. (1995). A model for technical inefficiency effects in a stochastic frontier production function for panel data. *Empirical Economics*, 20, 325–332.

Berger, A. N., Klapper, L. F. and Turk-Ariss, R. (2009). Bank competition and financial stability. *Journal of Financial Services Research*, 35(2), 99-118.

Boot, A. W. and Schmeijts, A. (2006). The competitive challenge in banking. In L. Renneboog (Ed.), Advances in corporate finance and asset pricing (133–160). Amsterdam: Elsevier.

Boyd, J. H. and De Nicolò, G. (2005). The theory of bank risk-taking and competition revisited. *Journal of Finance*, 60, 1329–1343.

Casu, B. and Girardone, C. (2009). Testing the relationship between competition and efficiency in banking: A panel data analysis. *Economic Letters*, 105, 134-137.

Casu, B. and Girardone, C. (2010). Integration and efficiency convergence in EU banking markets. *Omega*, 38, 260–267.

Chen, C. (2009). Bank Efficiency in Sub-Saharan African Middle-Income Countries. *International Monetary Fund (IMF) Working Paper* No. WP/09/14. Washington D.C.

Chen, X. (2007). Banking deregulation and credit risk: Evidence from the EU. *Journal of Financial Stability*, 2, 356–390.

Coccorese, P. (2014). Estimating the Lerner index for the banking industry: a stochastic frontier approach. *Applied Financial Economics*, 24(2), 73-88.

Coccorese, P. and Pellecchia, A. (2010). Testing the 'Quiet Life' hypothesis in the Italian banking industry. *Economic Notes*, 39(3), 173–202.

Delis, M. and Tsionas, E. (2009). The joint estimation of bank-level market power and efficiency. *Journal of Banking and Finance*, 33(10), 1842–1850.

Demsetz, H. (1973). Industry structure, market rivalry and public policy. *Journal of Law and Economics*, 16, 1-9.

Dick, A. and Lehnert, A. (2010). Personal bankruptcy and credit market competition. *Journal of Finance*, 65, 655–686.

Fu, X. and Heffernan, S. (2009). The effects of reform on China's bank structure and performance. *Journal of Banking and Finance*, 33, 39–52.

Fung, M. K. (2006). Scale economies, X-efficiency, and convergence of productivity among bank holding companies. *Journal of Banking and Finance*, 30, 2857–2874.

Granger, C. W. J. (1969). Investigating causal relations by econometric models and cross-spectral methods. *Econometrica*, 37, 424–438.

Hancock, D., Laing, A. and Wilcox, J. (1995). Bank capital shocks: dynamic effects on securities, loans, and capital. *Journal of Banking and Finance*, 19, 661–677.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, 50, 1029–1054.

Hicks, J. (1935). Annual survey of economic theory: The theory of monopoly. *Econometrica*, 3(1), 1–20.

Kamau A. W. (2011). Intermediation efficiency and productivity of the Banking sector in Kenya. *Interdisciplinary Journal of Research in Business, 1*(9), 12-26.

Koetter, M. and Vins, O. (2008). The quiet life hypothesis in banking. Evidence from German savings banks. Department of Finance, *Johann Wolfgang Goethe University Working Paper Series*: Finance and accounting Working Paper No. WP 190: Frankfurt, Germany.

Koetter, M., Kolari, J. and Spierdijk, L. (2008). Efficient competition? Testing the 'quiet life' of US banks with adjusted Lerner indices. Proceedings of the *44th 'Bank Structure and Competition' Conference*, Federal Reserve Bank of Chicago. Chicago, USA.

Koetter, M., Kolari, J. W. and Spierdijk, L. (2012). Enjoying the quiet life under deregulation? Evidence from adjusted Lerner indices for U.S. banks. *Review of Economics and Statistics*, 94(2), 462–480.

Leon, F. (2014). Market power and bank efficiency in low-income countries: Evidence from Africa. CERDI, Universit´e d'Auvergne, Paris.

Léon, F. (2015). What do we know about the role of bank competition in Africa? CERDI *Etudes et Documents* No. 16, Paris.

Love, I. and Zicchino, L. (2006). Financial development and dynamic investment behavior: Evidence from panel vector autoregression. *Quarterly Review of Economics and Finance*, 46, 190–210.

Mamatzakis, E., Staikouras, C. and Koutsomanoli-Filippaki, A. (2008). Bank efficiency in the new European Union member states: Is there convergence? *International Review of Financial Analysis*, 17, 1156–1172.

Matthews, K. and Zhang, N. (2010). Bank productivity in China 1997–2007: Measurement and convergence. *China Economic Review*, 21(4), 617–628.

Mora, N. and Logan, A. (2011). Shocks to bank capital: Evidence from UK banks at home and away. *Applied Economics*, 49(9), 1103-1119.

Ningaye, P., Mathilde, M. Y. and Luc, N. N. (2014). Competition and banking efficiency in the CEMAC zone. *International Journal of Economics and Finance*, 6(6), 127-139

Pruteanu-Podpiera, A., Weill, L. and Schobert, F. (2008). Banking competition and efficiency: A micro-data analysis on the Czech banking industry. *Comparative Economic Studies*, 50, 253–273.

Sala-i-martin, X. (1996). Regional cohesion: Evidence and theories of regional growth and convergence. *European Economic Review*, 40, 1325-1352.

Sarpong-Kumankoma, E., Abor, J., Aboagye, A.Q.Q. and Amidu, M. (2017). Freedom, competition and bank efficiency in Sub-Saharan Africa. *International Journal of Law and Management*, 59(6), 1359-1380.

Schaeck, K. and Cihak, M. (2008). How does competition affect efficiency and soundness in banking? Empirical evidence. *ECB Working Paper Series* No. 932. Frankfurt: European Central Bank.

Sims, C. (1980). Macroeconomics and reality, *Econometrica*, 48, 1–49.

Sunil, S. P. and Binsheng, Q. (2011). Competitiveness and Efficiency of the Banking Sector and Economic Growth in Egypt. *African Development Review*, 23(1), 99 – 120.

Turk-Ariss, R. (2010). On the implications of market power in banking: Evidence from developing countries. *Journal of Banking and Finance*, 34, 765–775.

Weill, L. (2004). On the relationship between competition and efficiency in the EU banking sectors. *Kredit und Kapital*, 37(3), 329–352.

Weill, L. (2009). Convergence in banking efficiency across European countries. *Journal of International Financial Markets, Institutions and Money*, 19, 818–833.

Williams, J. (2012). Efficiency and market power in Latin American banking. *Journal of Financial Stability*, 8, 263–276.

Zarutskie, R. (2013). Competition, financial innovation and commercial bank loan portfolios. *Journal of Financial Intermediation*, 22(3), 373-396

Zhao, T. and Murinde, V. (2011). Bank Deregulation and Performance in Nigeria. *African Development Review*, 23(1), 30 – 43.

Appendices

Appendix 5.A: Descriptive statistics of Stochastic Frontier Analysis input variables by REC per annum.

Variable	Region	2007	2008	2009	2010	2011	2012	2013	2014
TR	Africa	165977.8	203713	207345.9	220575.4	212654.4	233561	234194	236504.9
	AMU	203897.3	240461.7	237573.7	245868.6	236290.7	257049.2	283961.2	262482.5
	EAC	29744.8	33134.28	37601.59	39432.22	46153.2	56046.5	62932.0	64103.5
	ECCAS	41555.2	67741.72	81193.11	99862.88	125056.3	127196.1	133975.8	119100.9
	ECOWAS	76893.5	115275.6	152279.9	132079.5	129583.3	165991.6	185871.1	187863.3
	SADC	411967.4	472008.2	443565.4	492795	454612.2	459449.9	398116.1	401280.8
AR	Africa	0.107328	0.108082	0.109774	0.1055682	0.106176	0.108084	0.1076897	0.107647
	AMU	0.063616	0.061031	0.0548652	0.0565073	0.060276	0.054912	0.0583418	0.060151
	EAC	0.122174	0.117487	0.1175965	0.1148013	0.1232	0.136059	0.1291189	0.124729
	ECCAS	0.101000	0.105871	0.1216443	0.111038	0.109261	0.102091	0.1070171	0.1061055
	ECOWAS	0.109590	0.116098	0.1290409	0.1197102	0.113535	0.114254	0.1123206	0.114588
	SADC	0.136194	0.132582	0.1253105	0.1237838	0.119899	0.119749	0.1199325	0.1191224
TC	Africa	116406.9	148554.1	152156.9	159612.6	151374	162315.2	160999.5	161877.5
	AMU	129668.2	150324.4	145556	150103.9	146995	157038.3	169314	154430.1
	EAC	18772.6	21451.14	25574.64	25661.06	30525.3	39087.0	41775.92	42832.68
	ECCAS	24923.7	39313.16	47254.29	60613.71	79343.3	86363.0	94674.0	79483.31
	ECOWAS	52839.7	82254.54	128982.8	107006.5	92769.3	118175.9	133885.3	134502.7
	SADC	294410.5	367989.5	326406.7	374637.3	333688.1	326712.6	279607.8	284274.1
MC	Africa	0.079249	0.080247	0.086952	0.083584	0.08326	0.088669	0.087801	0.086144
	AMU	0.049742	0.036312	0.019904	0.0265417	0.030919	0.038204	0.033551	0.044202
	EAC	0.102149	0.091781	0.099582	0.0951883	0.105216	0.124713	0.11779	0.110815
	ECCAS	0.049714	0.077082	0.10801	0.1005883	0.089365	0.082735	0.097582	0.082596
	ECOWAS	0.075222	0.082650	0.095779	0.0920228	0.089712	0.089324	0.088318	0.088697
	SADC	0.090713	0.094495	0.099794	0.0960631	0.087483	0.088575	0.088510	0.087302
TA	Africa	1859237	2276231	2390215	2652713	2643282	2828342	2874111	2778612
	AMU	4057509	4546983	4665633	5081732	4879473	5451881	5894935	4812598
	EAC	253847.1	277256.3	317990.4	350912.1	401987.9	427375.2	491004.9	509962.1
	ECCAS	448699.1	747063.3	810501.3	950106.2	1167311	1376370	1558268	1335695
	ECOWAS	815624.3	1282089	1046841	1118038	1246036	1476795	1705860	1678443
	SADC	3375020	4081830	4673361	5294291	5098422	5101808	4550437	4506769
W1	Africa	0.019198	0.020392	0.02341	0.0230015	0.022351	0.022028	0.021602	0.0210984
	AMU	0.010173	0.010834	0.00958	0.0092802	0.010514	0.009403	0.008350	0.0086898
	EAC	0.024666	0.027547	0.03276	0.0289916	0.029905	0.030503	0.029099	0.0274978
	ECCAS	0.019050	0.020520	0.024189	0.0257724	0.021239	0.019361	0.021572	0.021232
	ECOWAS	0.022031	0.021952	0.024639	0.0234012	0.022240	0.021673	0.020437	0.019768
	SADC	0.021995	0.023666	0.027154	0.0299816	0.028091	0.027818	0.027257	0.026676
W2	Africa	1.51176	1.45506	1.54889	1.611982	1.805559	1.76047	1.712843	1.902593
	AMU	0.921961	0.710639	1.16891	1.265347	0.917078	1.006439	0.997229	0.78420
	EAC	1.93062	1.77077	1.77621	1.635345	1.920742	1.904703	1.966796	2.057097
	ECCAS	1.36510	1.24139	1.29413	1.728632	1.559327	1.739832	1.783675	1.703069
	ECOWAS	1.08296	1.06203	1.10251	1.252862	1.788978	1.887427	1.682985	1.992302
	SADC	2.05454	2.17841	2.38278	2.355207	2.728116	2.269792	2.136301	2.61598
W3	Africa	0.04571	0.040380	0.040101	0.040995	0.036871	.0356181	0.044994	0.035297
	AMU	0.026780	0.022507	0.022080	0.0192659	0.016885	0.0138826	0.015295	0.017913
	EAC	0.089535	0.034019	0.036201	0.0290346	0.035757	0.0553964	0.046440	0.051526
	ECCAS	0.01912	0.022694	0.024503	0.0220343	0.019326	0.017897	0.016496	0.014498
	ECOWAS	0.031217	0.048480	0.045960	0.039439	0.030766	0.033993	0.080269	0.034798
	SADC	0.045655	0.056476	0.058039	0.080207	0.065907	0.038630	0.038662	0.036350
EQ	Africa	179006.8	210748.2	206075.8	238885	251467.2	287171.9	299846.4	325657
	AMU	358297.8	387494.3	508685.3	536120.9	533542.2	608501.4	673007.4	663070.8

	EAC	34034.31	36516.9	42637.16	51885.02	53846.91	63572.1	75195.1	89683.4
	ECCAS	60433.01	75658.9	104656.6	118002	127962.8	143564.9	178867.1	179509.7
	ECOWAS	138713.6	221611.8	81807.33	113698.3	181055.5	224679.2	258542.2	298858.9
	SADC	285817.5	289612	337429.2	377976.8	375962.3	404132	356184.2	374562.9

Source: Authors' estimation of the Tanslog cost function using sfpanel model of Battesi and Coelli (1995); grouped by regional economic communities for the 2007-2014 period.

Appendix 5.B: Summary statistics of inefficiency equation variables

Region/Variable		GDPPC	Inflation	FSD	Bank Concentration	Capitalization
Africa	Mean	2479.548	68.383	24.946	78.777	250781.000
	SD.	2652.668	1212.611	20.906	14.430	725566.300
AMU	Mean	4465.320	4.263	40.129	82.651	532836.800
	SD.	2425.022	2.597	25.625	13.356	856225.200
EAC	Mean	811.487	9.982	17.546	68.187	56028.780
	SD.	283.175	6.442	9.242	11.154	87048.110
ECCAS	Mean	3195.685	7.632	10.216	83.763	126605.000
	SD.	3168.849	5.571	6.179	6.712	231537.600
ECOWAS	Mean	1319.784	6.865	19.074	77.020	187614.800
	SD.	901.993	6.754	11.985	16.323	513261.800
SADC	Mean	4202.462	287.835	37.594	87.418	353811.300
	SD.	3628.687	2603.414	29.700	11.672	**1201862**

Source: WDI Database of the World Bank Group (2015), Heritage Foundation (2015) and Authors' estimation from Bank scope data for 405 banks across 47 African countries for 2007-2014.

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CHAPTER SIX

FINANCIAL INTEGRATION, BANK LENDING BEHAVIOR AND ECONOMIC GROWTH IN AFRICA: A SUB-REGIONAL ANALYSIS

6.1 Introduction

The relationship between financial integration, bank credit and economic growth has important policy implications for both advanced and emerging economies. A considerable body of literature identifies the scale, scope and accessibility of loanable funds as the fulcrum for driving consumption, production and economic growth in a country (Yartey, 2008; Demirguc-kunt ane Levine, 2009; Ngalawa and Viegi, 2011; De Nicolo and Juvenal, 2014; Law and Singh, 2014; Menyah et al., 2014; Pradhan et al., 2014a). According to the financial repression theory, factors which enhance the volume, scope and quality of financial services are growth enhancing (McKinnon, 1973; Shaw, 1973). Therefore, an integrated and well-developed financial system serves as a desirable catalyst for promoting credit expansion and real economic growth through effects on market participation, capital mobility and the competitive conduct of financial intermediaries (Saafi, Mohamed and Doudou, 2016). There is however conflicting evidence in the empirical finance-growth literature on the nature and direction of causality between finance and economic growth. Besides, several recent empirical studies blame the onset and scale of the recent global financial crisis on growth in risky bank-lending activities resulting from financial integration-induced competitive pressures of poorly regulated financial markets (Cetorelli and Goldberg, 2011; Lane, 2012; Fiordelisi and Mare, 2014). These contentions highlight the need for regions seeking the growth benefits of financial integration to continually monitor the outcomes of financial integration policies on credit expansion and economic growth of participating economies.

Also, there remains an unresolved contention in the literature concerning the direction of causality between bank credit expansion and economic growth. Proponents of the Schumpeterian school of thought insist on a supply-leading nexus, explaining that bank credit expansion precedes real sector growth (Beck and Levine, 2004; Cecchetti and Kharroubi, 2012; Law and Singh, 2014). In contrast, those in support of the 'demand-following' view of Robinson (1952) contend that bank credit growth and banking sector development are only passive responses to economic growth and the corresponding need for more finance (Kar et al., 2011). A third strand of the literature suggest that the relationship is bidirectional, with benefits

from one reinforcing the other (Cheng, 2012; Pradhan et al, 2014a). Also, Lucas (1988) argues that the importance of finance for growth is highly "over-stressed".

Africa's need for greater and faster economic growth cannot be overemphasized. The region has some of the poorest countries of the world, with many facing such developmental challenges as poor infrastructure, poor healthcare, inequality and insecurity among others (World Banks WDI, 2015). Also, African economies are largely characterized by fledgling bank-dominated financial systems with embryonic or non-existing stock markets (Yartey and Adjasi, 2007; Standley, 2010; Nyantakyi and Sy, 2015). These factors limit access to investment capital and slow down economic growth, highlighting the urgent need for appropriate interventions to promote economic growth and development in the region. Following the generally held view that more finance enhances economic growth, most African countries turned to regional and international financial integration as a panacea to their capital accumulation, distribution and economic growth challenges. This informs the spate of financial sector reforms adopted by many African countries over the last three decades. These reforms are largely aimed at propelling economic growth in the common market by harnessing the scale, scope and cost-reduction benefits of international capital mobilization and distribution using cross-border banking and investment collaborations (African Development Bank, 2010).

However, there is a paucity of literature evaluating the outcomes of financial integration in Africa. Specifically, cross-country studies on the causal nexus between financial integration, bank lending and economic growth in Africa are lacking in the empirical literature (AfDB, 2010). Most studies are limited to analysis of single-country or individual regional economic communities' (RECs) data. According to Ahmed and Mmolainyane (2014), such limitations increase the controversy in the literature on Africa and constrain the practical application of the findings for crafting broad-based policy interventions to ensure synergies across RECs in the larger agenda of Africa's economic emancipation. It is therefore important to provide African leaders with the empirical evidence on the nexus between financial integration, bank lending behavior and economic growth in the various sub-regional blocs. This will help guide policy choices that speeds up the harmonization and expansion of economic growth in Africa.

The chapter provides a comprehensive analysis of the causal nexus between financial integration, bank lending behavior and economic growth in five major regional economic communities of Africa. Using data from 47 African economies over the 2007-2014 period, the study employs convergence analysis, Granger-causality tests and impulse response function analysis to respectively analyze evolution of bank lending behavior and economic growth after years of financial reforms and assess the causal nexus between financial integration, bank lending and economic growth in Africa and five sub-regional markets. The

chapter therefore contributes to the sparse literature on the finance-growth nexus debate in Africa and provides guidance for peer-learning across the various rucks of financial integration projects in Africa.

The novelty of the chapter is in fourfold. First, the study uses a large sample of 47 African countries across five regional economic communities for the period 2007-2014, making this the largest cross-country study on the finance-growth nexus in Africa. Second, the chapter combines two strands of literature, highlighting both the role of financial integration and bank lending behavior in determining economic growth in emerging markets. Third, the chapter tests for a feedback causality between the variables, allowing the chapter to examine the supply-leading, the demand-following hypotheses and the feedback theory using panel vector auto-regressive (pVAR) models for testing Granger-causality. According to Pradhan et al. (2014a), this approach is seldom used in the finance-growth nexus literature in nascent markets. Fourth, the chapter allows for a comparison of the findings between the full sample and the sub-regional markets, highlighting the relative importance of financial integration and banking lending on economic growth across Africa's sub-regional markets. The comparative dimension also allows for peer-learning and better policy formulation. This understanding is expected to guide the adoption of broad-based policies that will ensure greater and a more harmonious growth performance in African economies across the common market.

The rest of the chapter is structured as follows. Section 6.2 reviews the pertinent theoretical and empirical literature. Section 6.3 describes the data and methodology used while Section 6.4 presents and discusses the results. Section 6.5 concludes the chapter.

6.2 Literature review

Theoretically, three main competing, yet complementing views explain the variations in the economic growth rates and the wealth of nations across the world. First, the Neo-Classical growth theory of Solow (1956) and Swan (1956) postulate that economic growth is determined by labor, capital and technology and that variations in economic growth rates depends on the volume and efficient combination of these factors. Solow (1956) however emphasized that credit growth only results in temporary spikes in economic growth, insisting that sustainable long-run economic growth can only be achieved by improvements in technology[34]. In contrast, the 'Endogenous-Growth' theory contends that economic growth is a function of endogenous

[34] This theory however fails to explain the economic determinants of the technological advancements needed to enhance output growth.

rather than external factors. Proponents of the endogenous growth model argue that economic growth is a factor of investments in innovation, knowledge and human capital development, each with positive externalities for output growth (Romer, 1986). The endogenous growth model therefore emphasizes the significance of capital markets in promoting investments in innovation and human resource development for growth (King and Levine, 1993; Levine, 1997). A third strand of the literature, which more formally emphasized the significance of international finance in the intermediation process, is the 'Financial Repression' theory. According to McKinnon (1973) and Shaw (1973), variations in the level of economic growth across countries can largely be explained by the quantity and quality of financial services provided in each economy. Notwithstanding the theoretic variances, a common factor identified by these competing models is the role played by finance in economic growth. Whether capital originates from within or outside an economy and whether it is used directly for production or invested in technological advancement, it deemed important for economic growth.

The empirical growth literature is replete with controversies regarding the nature of the relationship between financial integration, bank credit and economic growth[35]. The standard view, which follows the financial repression model, is that a liberalised, integrated and well-developed financial sector promotes the formation of international synergies in credit accumulation and distribution for greater and faster economic growth in participating economies (Esso, 2010; Affinito, 2011; Saafi et al., 2016). Financial integration also provides opportunities for the diffusion of technology from capital abundant and technologically advanced economies to capital and technological deficient economies, expanding the opportunities for higher economic growth (Badri and Sheshgelani, 2016). This is largely achieved through cross-border banking and investment activities. Besides, the law of one price assumes that deeper financial integration will stimulate competition among banks, reduce intermediation spreads and upsurge the scale, scope and quality of banking services, with positive benefits for output growth in a common market (Affinito, 2011).

In contrast, several recent studies contend that deeper financial integration and credit growth might increase financial fragility and adversely affect economic growth (Swamy and Sreejesh, 2013; Ladime et al., 2013; Menyah et al., 2014; Shijaku, 2017)[36]. For instance, Cucinelli (2015) argue that upsurges in international capital flows and the need for banks to maintain their profit profiles often stimulates them to

[35] Moshirian and Wu, 2012; Menyah et al., 2014; Pradhan et al, 2014a, to mention but a few.

[36] This is evidenced by the conduct of financial intermediaries in the well-developed and integrated financial markets prior to, during and after the 2008 global financial crisis (Lane, 2012; Fiordelisi and Mare, 2014).

engage in high-risk lending behavior exposing the financial system to instability and low economic growth. Similarly, Petkovski and Kjosevski (2014) found a significant inverse relationship between bank credit to the private sector and economic growth in 16 transition economies from Central and South-Eastern Europe for the 1991-2011 periods. Also, in a more recent study of Central, Eastern and South-Eastern European countries over 1995-2014, Bongini et al. (2017) found evidence challenging the ideas that bank lending growth spurs real sector growth and foreign banks augment economic growth. Indeed, Frey and Voltz (2011) found no significant relationship between regional financial integration and financial sector development in Sub-Saharan African countries.

There is also an unresolved contention in the literature about the direction of causality between bank lending behavior and economic growth. Three rucks of arguments are identified. First, the 'supply-leading' hypothesis advocates that finance precedes economic growth (McKinnon, 1973; Shaw, 1973). This is backed by a plethora of empirical studies (Cappiello et al., 2010; Wu et al., 2010; Jalil et al., 2010; Affinito, 2011; Bojanic, 2012; Chaiechi and Kharroubi, 2012; Hsueh et al., 2013; Menyah et al., 2014; Pradhan et al., 2014b among others). According to this hypothesis, bank credit growth enhances investment growth and increases in overall economic output. In contrast, the 'demand-following' hypothesis argues that credit and financial markets grow in response to economic growth and higher demand for output (Panopoulou, 2009; Kar, Nazlioglu and Agir, 2011). In support of the demand following hypothesis are studies by Ang and McKibbin (2007), Panopoulou (2009) and Odhiambo (2010). A third strand of the literature, which follows the 'feedback' theory, argues that the causality is bidirectional and runs in both directions, with each reinforcing the other (Demetriades and Hussein, 1996; Kakilli et al., 2009; Lee and Chang, 2009; Wolde-Rufael, 2009; Pradhan et al., 2014a).

However, empirical literature on the finance-growth nexus in Africa is scanty and mostly limited to single-country, single-sub-regional market or limited cross-country analysis (Gisanabagabo and Ngalawa, 2016). For instance, a recent study by Nzioka (2017) found that increased capital flows from deeper financial integration have a significant positive effect on economic growth in the East Africa Community. Also, Kouki and Rezgui (2017) found that financial integration positively affects economic growth in Maghreb countries for the period 1981-2014. However, a combined study of the COMESA and SADC regions by Misati et al. (2015) showed that while the full sample revealed no significant relationship between financial integration and economic growth for the 1970-2011 period, a disaggregation of the data into COMESA and SADC samples showed that financial integration had a significant positive effect on economic growth in both regions though the effect was stronger in the COMESA sample. Also, Ojeaga et al. (2013) found that

commercial bank lending in Nigeria negatively affected economic growth over the 1989-2012 period. Similarly, Gisanabagabo and Ngalawa (2016) found evidence of the supply leading hypothesis in the Rwandan economy, over the period 1996-2010, with shocks in bank credit playing a dominant role in determining fluctuations in economic growth. Yet, Kakilli et al. (2009) studied the causal nexus between finance and economic growth in 24 Sub-Saharan African countries over 1975-2005 and concluded that a feedback causality exists between financial sector development and economic growth in Sub-Saran Africa.

In view of Africa's plan for achieving greater harmonization of its financial and real sectors, the lack of an extensive study and a sub-regional critique clogs the broad and holistic empirical understanding needed by policy makers to chart the course of Africa's integration and growth agenda (AfDB, 2010). It is therefore important to provide African leaders with the empirical evidence on the sub-regional differences in the nexus between financial integration, bank lending behavior and economic growth to guide policy choices that spur financial sector development and economic growth across the common market. To the best of the researcher's knowledge, this is the first extensive study to combine the two strands of literature by empirically examining the nexus between financial integration and bank credit growth on real economic growth in Africa and further provide a sub-regional discourse into these relationships. The sub-regional markets studied form the bedrocks of Africa's regional economic integration and serve as nodes for peer-learning and policy formulation.

6.3 Data and methodology

The empirical analysis utilizes annual country level data from 47 African economies over the period 2007-2014. The data for per capita GDP growth rate and private credit by deposit money banks to GDP are obtained from the World Bank Group's (2016) World Development Indicators (WDI) and Global Financial Development Databases (GFDD) respectively. The financial freedom index data is obtained from the Economic Freedom Index database of the Heritage Foundation (2016). The study further breaks the sample into five sub-strata based on membership of five regional economic communities. The variables used for the study are financial freedom index (FI), private credit to the domestic sector by banks (BLB) and per capita GDP growth (GDPGPC). Financial freedom index captures the effects of financial sector liberalization on bank lending behavior and economic growth. Private credit to the domestic sector by banks, measured as a percentage of GDP, accounts for changes in bank lending conduct in response to either financial integration-induced changes in their competitive environment or reactions to greater

economic growth and the subsequent need for more loans. Also, the study uses annual per capita GDP growth as a proxy for economic growth. Per capita GDP growth measures the relative changes in income per unit population in a country and accounts for changes in household earnings and investment capacity overtime. This could result from either cross-border capital flows or technological transfers resulting from greater financial liberalized and deeper integrated or from credit expansion due to competitive banking conduct (Pradhan et al., 2014).

6.3.1 Empirical strategy

The study employs a three-step analytical procedure to unravel the nexus between financial integration, bank lending behavior and economic growth in five regions of Africa. First, the study assesses the effectiveness of financial integration in leveling bank lending and economic growth across Africa using unconditional β- and σ-convergence tests. The law of one price postulates that a well-integrated economic region is expected to promote a harmonious distribution of banking services and growth patterns among participating economies. Therefore, in line with Barro and Sala-i-Martin (1991), the continuous pursuance of deeper financial integration in Africa is expected to promote a catch-up effect in both bank lending behavior and economic growth. Thus, bank lending and economic growth in previously poor performing countries in Africa is expected to catch up with initially better performing economies in line with the β-convergence framework. All things being equal, the achievement of β-convergence is expected to lead to σ-convergence, where the inter-country discrepancies in bank lending behavior and economic growth across African economies is reduced overtime allowing each country's average bank lending and economic growth to move towards the Africa average overtime (Sala-i-Martin, 1996). The study tests for β-convergence as follows:

$$\Delta \ln(Y_{j,t}) = \alpha + \beta \ln\left(Y_{j,t-1}\right) + \rho \Delta \ln(Y_{j,t-1}) + \varepsilon_{j,t} \quad (23)$$

where, $Y_{j,t}$ represents the mean value of the variable in question (bank lending behavior and per capita GDP growth) for country j in year t. $Y_{j,t-1}$ is the mean value of the variable in question for country j in year t-1; $\Delta \ln(Y_{j,t}) = \ln\left(Y_{j,t}\right) - \ln\left(Y_{j,t-1}\right)$; α, β and ρ are parameters to be estimated while $\varepsilon_{j,t}$ is the error term. According to Barro and Sala-i-Martin (2004), β-convergence is absolute if initially poor performers increase their marginal performance at a faster rate than initially good performers to catch up with them. Therefore,

in a univariate regression, a negative β value is interpreted as evidence of absolute β-convergence and higher relative coefficients indicate a greater probability for convergence and vice versa.

The study estimates σ-convergence using the following equation:

$$\Delta W_{j,t} = \alpha + \sigma W_{j,t-1} + \rho \Delta W_{j,t-1}) + \varepsilon_{j,t} \quad (24)$$

where $W_{j,t} = \ln(Y_{j,t}) - \ln(\bar{Y}_t)$; $W_{j,t-1} = \ln(Y_{j,t-1}) - \ln(\bar{Y}_{t-1})$; Y_{it} and $Y_{it-1}$are defined as before in equation 8; $\bar{Y}_t$ respectively represents the mean level of the variables in question for the full sample and subsequently for the sub-regional samples in year t. $\bar{Y}_{t-1}$ is the value $\bar{Y}$ at time t-1; $\Delta W_{j,t} = W_{j,t} - W_{j,t-1}$; again α, σ and ρ are parameters to be estimated while $\varepsilon_{j,t}$ is the error term. A negative value of σ is interpreted as evidence of σ-convergence of variable $Y_{j,t}$ towards $\bar{Y}_t$ and larger values of |σ|<0 indicates a faster rate of σ-convergence in a comparative analysis. This measures the speed at which each country's competition and efficiency levels are converging to the African average. Following Casu and Girardone (2009) Equations 23 and 24 are estimated using fixed effects model.

In the second step, the study adopts the following empirical model to examine the causal nexus between financial integration, bank lending behavior and economic growth in the five regions of Africa:

$$GDP_{j,t} = f(FI_{j,t}, BLB_{j,t}) \quad (25)$$

where GDP represents per capita GDP growth; BLB is the measure of bank lending behavior, proxied by private credit to the domestic sector expressed as a percentage of GDP; FI denotes a country's financial integration proxied by financial freedom index; j and t refer to country and time (in years) respectively and controls reflect the various control variables. Specifically, the study follows the works of Pradhan et al. (2014a; b) to estimate the following panel autoregressive distributed linear (PVAR) specification:

$$Y_{i,t} = \alpha_0 + \sum_{k=1}^{L} \alpha_k Y_{i,t-k} + \sum_{k=1}^{L} \beta_k X_{i,t-k} + u_i + v_{i,t} \quad (26)$$

where $Y_{i,t}$ and $X_{i,t-1}$are alternately represented by the three variables under study[37] respectively for country i (i= 1…, N) in year t (t=L+1,..., T); and L represent optimal moment and model lags used, selected

[37] The panel VAR estimator test for revere causality for all independent variables, therefore alternating the regressors to test for causality running in all possible directions. This makes each of the three regressors a dependent variable at some point based on what direction of causality is being tested.

based on Andrews and Lu (2001) consistent model and moment selection criteria (MMSC) for panel VAR estimations based on Hansen's (1982) test of over identifying restrictions[38]. α_0 is the intercept; $\alpha_k \text{and } \beta_k$ are estimated parameters. u_i is the bank-specific effect and $\upsilon_{i,t}$ is the disturbance term.

Equation 26 is implemented in line with Holtz-Eakin, Newey, and Rosen (1988) and Hancock et al. (1995) panel VAR models following Arellano and Bover (1995) system generalized method of moments (GMM) estimation techniques. Specifically, the study employs the pVAR model of Abringo and Love (2016), which allows us to, in one step, test for bidirectional causal relationships for each set of variables. The pVAR estimator follows Arellano and Bover (1995) system GMM estimation method, accounting for individual bank heterogeneity while allowing untransformed lagged regressors to be used as instruments (Abrigo and Love, 2016). This is done by forward mean differencing the variables of interest and estimating their coefficients by a system of general method of moments (GMM). The study further uses impulse response analysis to examine how each dependent variable responds to shocks in all three variables under study following Sims (1980) Cholesky decomposition. These methods both allows the study to examine the causal effect of financial integration on bank lending behaviour and economic growth as well as test all three theories of the finance-growth nexus debate (the supply leading hypothesis, demand-following hypothesis and feedback theory).

In line with the extant literature, the study implies Granger-causality when the results show a significant joint null $\sum \beta_i$=0 and the sign of the causal relationship represents the direction of causality (Granger, 1988; Casu and Girardone, 2009; Abrigo and Love, 2016). Therefore, in the estimations involving GDP and BLB, a positive (or negative) statistically significant sum of the coefficients of lagged BLB is viewed as evidence in support of the supply-leading hypothesis because previous increases in bank lending activities precede per capita GDP growth (or decline). Also, when BLB is the dependent variable, a positive and significant sum of the coefficients of lagged GDPGPC is viewed as evidence of the demand-following hypothesis, implying that previous years' GDP growth precedes a rise in bank lending behaviour, and thus positive Granger-causes bank lending behaviour and vice versa. Similar interpretations are given to the estimations involving financial integration and GDP as well as those involving FI and BLB.

[38] The optimal lag is chosen where the MBIC, MAIC and MQIC are smallest and Hansen-J p-value is above 0.1 (Andrews and Lu, 2001; Abrigo and Love, 2016).

6.4 Results

Table 6.1 presents a summary of the descriptive statistics for the main variables used in the study and Appendix B presents the pairwise correlation between these variables. Table 6.1 shows that average per capita GDP growth in Africa for the period 2007-2014 is 1.026. In the sub-regional markets, SADC seems to lead the other regions in terms of per capita GDP growth, recording an average per capita GDP growth rate of 1.130 percent. This is followed by the ECOWAS region with an 8-year average per capita GDP growth rate of 1.017 percent. Also, the EAC recorded an average per capita GDP growth rate of 0.887 while ECCAS recorded a rate of 0.841 and the AMU sub-region lagged behind with and average per capita GDP growth rate of 0.774 percent.

Table 6.1: Summary statistics on variables

Variable	Mean	SD.	Min.	Max	Median	Skew	Kurtosis
Panel 1: Africa							
GDPGPC	1.026	0.872	-2.085	4.651	1.178	-0.637	4.907
FI	3.705	0.389	2.303	4.248	3.689	-1.274	4.800
BLB	2.789	0.823	-1.089	4.630	2.783	-0.405	4.605
Panel 2: AMU							
GDPGPC	0.774	1.068	-1.931	4.651	0.739	1.183	8.721
FI	3.460	0.351	2.996	4.094	3.401	0.332	2.309
BLB	3.322	0.837	1.683	4.289	3.315	-0.271	1.721
Panel 3: EAC							
GDPGPC	0.887	0.854	-1.431	2.135	1.134	-0.756	2.886
FI	3.802	0.242	3.401	4.248	3.912	-0.316	2.357
BLB	2.438	0.929	-1.089	3.550	2.519	-2.098	7.768
Panel 4: ECCAS							
GDPGPC	0.841	0.962	-1.675	2.917	1.058	-0.665	3.835
FI	3.583	0.307	2.996	3.912	3.689	-0.945	2.709
BLB	2.034	0.645	0.594	2.987	2.177	-0.441	2.227
Panel 5: ECOWAS							
GDPGPC	1.017	0.890	-2.085	2.882	1.129	-0.772	4.072
FI	3.740	0.321	2.996	4.248	3.689	-1.128	3.667
BLB	2.752	0.632	1.252	4.158	2.801	-0.115	3.296
Panel 6: SADC							
GDPGPC	1.130	0.734	-1.682	2.376	1.316	-1.300	5.737
FI	3.797	0.474	2.303	4.248	3.912	-2.151	7.344
BLB	3.141	0.746	1.596	4.630	3.009	0.436	2.173

Notes: Values reported are natural logs of the original variables. GDPGPC is per capita GDP growth; BLB is domestic credit to private sector by banks expressed as a percentage of GDP; FI is financial freedom index.

Table 6.1 further shows that financial freedom is also generally low in Africa. For the study period, the regional average financial freedom index is 3.705 while the AMU recorded an average financial freedom index of 3.460. The EAC, ECCAS, ECOWAS and SADC regions recorded averages of 3.802, 3.583, 3.740 and 3.797 respectively. Similarly, bank lending has been generally low in Africa, with a regional average of 2.789 over the period 2007-2014 and peaking at 3.322 in the AMU sub-regional market. This is followed by bank lending in the SADC region (3.141), ECOWAS (2.752, EAC (2.438) with ECCAs recording the lowest private credit to the domestic sector by banks of 2.034 percent of GDP. The correlation matrix in Appendix B shows no evidence of multicollinearity between the three regressors (Kennedy, 2008).

6.4.1 Evolution of financial integration, bank lending behavior and economic growth in Africa

Table 6.2 presents annual mean values of the three main variables under study for the full sample of 47 countries (Africa) as well as the sub-regional samples over the period 2007-2014. Table 6.2 shows that average per capita GDP growth has reduced in Africa since the onset of the recent global financial crisis. Apart from the ECOWAS sub-region, none of the other samples recorded a per capita GDP growth rate as high as the 2007 average over the study period. For the full sample, average per capita GDP growth rate stood at 4.565 in 2007. This figure dropped to 3.219 in 2008 and further dropped to 1.291 in 2009. Subsequently, average per capita GDP growth rose to 3.544 in 2010, but fell back to 1.807 in 2011. In 2012 the per capita GDP growth rose to 4.413 and dropped again in 2013 (2.370) and further in 2014 (2.040). Similar trends are recorded by the sub-regional markets, with the AMU suffering the worse from the economic recession and other sub-regional factors. The recessions recorded in the AMU could also be attributed to such factors as the so called 'Arab spring' which saw major instability in the Arab Maghreb Union countries like Algeria, Mauritania, Morocco, Tunisia, Libya among others, further deepening the recession from the financial crisis in this sub-region.

The average domestic credit to private sector by banks expressed as a percentage of GDP (BLB) has generally increased in all regions over the years, only seeing a marginal drop in each sample in one year or the other. For the full sample (Africa), BLB rose from 21.727 percent of GDP in 2007 to 23.736% of GDP in 2008 and further to 26.327 in 2009. However, BLB dropped slightly in 2010 to 24.6205 of GDP and rose marginally thereafter, reaching an average of 26.958% of GDP in 2014. Generally, the AMU leads Africa in terms of bank lending, recording an average private credit to the domestic sector by banks of 40.129% of GDP over the 2007-2014 period. This is followed by SADC with an 8-year average of 37.596. The other

regions all fall below the African average of 24.946%, with ECOWAS, EAC and ECCAS respectively recording an average BLB of 19.074%, 17.546% and 10.216% for the period 2007-2014. However, financial freedom seems to be very limited in the AMU for the study period despite the high bank lending activities in the region. While the 8-year average for the full sample stands at 45.237 for the period 2007-2014, that of the AMU is 34.178. The ECCAS sub-region was the second least free financial system in Africa with an average financial freedom index (FI) of 36.692 for the 8-year period. This is followed by the ECOWAS (46.119), EAC (49.966) and the SADC (50.797) as the most financially free sub-region in Africa.

Table 6.2: Evolution of financial integration, bank lending and economic growth in Africa

Variable	Region	2007	2008	2009	2010	2011	2012	2013	2014	Total
GDPGPC	Africa	4.565	3.219	1.291	3.544	1.807	4.413	2.370	2.040	2.886
	AMU	3.257	2.082	0.458	2.512	-7.158	16.715	-0.125	-0.568	2.212
	EAC	4.566	1.814	1.902	3.585	3.830	0.097	2.608	2.866	2.620
	ECCAS	8.484	4.081	-0.726	1.895	1.710	2.696	1.611	2.905	2.678
	ECOWAS	3.106	3.769	1.814	3.622	2.897	4.146	3.638	2.242	3.167
	SADC	4.966	3.149	0.373	4.501	3.587	3.133	2.634	1.869	2.990
BLB	Africa	21.727	23.736	26.327	24.620	24.995	25.556	25.885	26.958	24.946
	AMU	32.350	34.920	39.081	39.348	41.853	41.383	44.410	50.972	40.129
	EAC	15.022	16.011	16.572	17.585	18.275	19.656	18.055	19.013	17.546
	ECCAS	5.994	6.991	10.257	10.339	10.241	11.587	12.670	13.651	10.216
	ECOWAS	16.146	19.151	22.040	18.274	18.313	18.646	19.409	20.666	19.074
	SADC	32.659	35.744	43.428	36.229	36.394	37.976	39.321	40.090	37.594
FI	Africa	46.826	46.677	45.439	45.029	45.259	44.558	44.123	44.367	45.237
	AMU	29.535	32.340	32.826	34.902	36.000	35.714	35.957	35.789	34.178
	EAC	52.090	52.113	50.133	50.141	50.267	50.395	48.158	46.571	49.966
	ECCAS	44.091	41.739	35.484	35.143	35.366	35.250	35.250	36.129	36.692
	ECOWAS	50.617	46.667	45.889	45.455	45.532	44.944	44.886	45.270	46.119
	SADC	55.263	55.156	50.533	49.250	49.512	49.398	49.277	50.256	50.797

Source: Author's calculation from WDI and Economic Freedom databases. **Notes:** Actual annual mean values of each variable are reported here to show the inter-REC variations over time. GDP is the per capita GDP growth, BLB is domestic credit to private sector by banks expressed as a percentage of GDP; FI is financial freedom index.

Table 6.3 presents the convergence tests results for the lending behavior of banks and economic growth in Africa and for the five sub-regional blocs under study. The theory of one price suggests that integrating economies develop synergies that allow for a reduction in the disparities between their key performance indicators.

Table 6.3: Convergence of bank lending behavior and economic growth in Africa and five sub-regional markets

Region	Africa		AMU		EAC		ECCAS		ECOWAS		SADC	
	BLB	**GDP**	**BLB**	**GDP**	**BLB**	**GDP**	**BLB**	**GDP**	**BLB**	**GDP**	**BLB**	**GDP**
	β-Convergence											
α	**1.116*** **	**1.281*** **	**2.943*** **	0.189	**0.690** **	**1.493** **	**0.667** **	0.588	**0.939*** **	**0.927** **	**1.196*** **	0.636
	(0.141)	(0.177)	(0.616)	(0.391)	(0.266)	(0.470)	(0.267)	(0.332)	(0.216)	(0.281)	(0.196)	(0.594)
β	**-0.378*** **	**-1.130*** **	**-0.853*** **	-0.573	**-0.252** **	**-1.511** **	**-0.285** **	-0.372	**-0.332*** **	**-0.732** **	**-0.367*** **	-0.627
	(0.050)	(0.147)	(0.185)	(0.487)	(0.105)	(0.451)	(0.133)	(0.343)	(0.079)	(0.235)	(0.061)	(0.429)
ρ	0.024	**0.179***	**-0.316** **	-0.789	0.059	0.099	0.225	-0.521	**0.378*** **	0.171	**0.263** **	-0.168
	(0.060)	(0.101)	(0.141)	(0.402)	(0.093)	(0.232)	(0.196)	(0.292)	(0.104)	(0.171)	(0.103)	(0.285)
R-Square	0.223	0.439	0.710	0.861	0.195	0.673	0.149	0.585	0.264	0.268	0.497	0.336
F-statistic	**29.64*** **	**37.87*** **	**24.44*** **	**12.34** **	**2.90***	**13.37*** **	**2.45***	2.11	**11.13*** **	**5.14** **	**24.67*** **	**7.08** **
	σ-Convergence											
α	**0.020** **	**0.175*** **	**0.529*** **	-0.200	**-0.115** **	0.018	**-0.252** **	**0.292** **	-0.013	**0.226** **	**0.152*** **	0.118
	(0.008)	(0.049)	(0.133)	(0.221)	(0.045)	(0.113)	(0.123)	(0.093)	(0.014)	(0.092)	(0.027)	(0.170)
σ	**-0.444*** **	**-1.089*** **	**-0.892*** **	-0.202	**-0.471** **	**-1.376** **	**-0.398** **	-0.066	**-0.423*** **	**-0.706** **	**-0.400*** **	**-0.830***
	(0.058)	(0.151)	(0.232)	(0.694)	(0.153)	(0.536)	(0.149)	(0.335)	(0.089)	(0.228)	(0.068)	(0.424)
ρ	0.081	0.146	-0.271	-1.025	**0.195***	0.034	**0.331***	-0.453	**0.445*** **	0.135	**0.360** **	-0.016
	(0.063)	(0.103)	(0.166)	(0.548)	(0.102)	(0.279)	(0.196)	(0.301)	(0.111)	(0.165)	(0.109)	(0.290)
R-Square	0.231	0.423	0.683	0.835	0.304	0.630	0.216	0.456	0.298	0.265	0.475	0.344
F-statistic	**31.14*** **	**35.53*** **	**21.51*** **	**10.14** **	**5.23** **	**11.09*** **	**3.87** **	1.26	**13.16*** **	**5.05** **	**22.62*** **	**7.33** **

Notes: *, **, *** respectively indicate significance at the 10%, 5% and 1% levels. Significant coefficients are in bold and standard errors are reported in parenthesis. BLB is bank lending behavior, proxied by domestic credit to private sector by banks expressed as a percentage of GDP and GDPGPC is per capita GDP growth.

Table 6.3 shows that the continuous pursuit of deeper financial integration in Africa promotes a catch-up effect in bank lending behavior across Africa, allowing countries that initially had low bank lending to GDP rates to catch-up with initially high performers. This is because the study finds evidence of β-convergence of domestic credit to private sector by banks (expressed as a percentage of GDP) in Africa and the five sub-regional markets. Comparatively, countries in the AMU sub-region have the fastest converging bank lending behavior in Africa (0.853), beating the speed of bank lending convergence in Africa (0.378). This is followed by SADC member countries (0.367), ECOWAS sub-region (0.332), ECCAS (0.285) and the EAC (0.252) respectively. Also, the results show evidence of a reduction in the inter-country disparities in the lending behavior of banks in all six samples, providing evidence of σ-convergence of bank lending behavior towards the African average in all samples. The results on Table 6.3 further shows evidence of GDP convergence in Africa (1.130), especially in the EAC (1.511) and ECOWAS (0.732) sub-regions. This shows that increasing financial integration and the harmonization of bank lending behavior across Africa has significant benefits for economic growth harmonization across countries in Africa, especially for the EAC and ECOWAS sub-regions.

6.4.2 Causal nexus between financial integration, bank lending and economic growth

In this section, the study discusses the causality between the three variables. Table 6.4 and 6.5 present the results for the Granger-causality tests between financial integration, bank lending and economic growth in Africa and the five regional economic communities respectively. The analysis was done using the pVAR model of Abringo and Love (2016). The results on Table 6.4 show that the coefficients of the one-year lags of each independent variable in question have a positive and significant effect on current values of itself. This confirms the fact that previous year performance of each independent variable affects its current year values. Also, the findings show that for the period 2007-2014, the three variables had a general positive effect on each other for all the full sample of 47 African countries studied except in column (c) where per capita GDP growth had a negative effect on bank lending behavior. However, these coefficients were not significant to imply Granger causality in Africa, supporting the findings of Ahmed and Mmolainyane (2014) and Menyah et al. (2014).

Table 6.4: Causality between financial integration, bank lending and economic growth: Full sample

Dep. Variable	GDPGPC		BLB		FI	
Models	(a)	(b)	(c)	(d)	(e)	(f)
Panel 1: Africa						
GDPGPC_{t-1}	**0.382***(0.108)**	**0.406**(0.182)**	-0.020(0.017)		0.004(0.009)	
BLB_{t-1}	0.877(0.611)		**0.951***(0.134)**	**0.892***(0.182)**		0.049(0.059)
FI_{t-1}		1.682(4.524)		0.262(0.352)	0.136(0.277)	**0.468**(0.157)**
GMM criterion	0.073	0.071	0.073	0.093	0.071	0.093
Observations	140	149	140	205	149	205
Panels	40	42	40	42	42	42
Hansen	0.603	0.564	0.603	0.089	0.564	0.089

Notes: *, **, ***, indicate significance at the 10%, 5% and 1% levels respectively. Bank lending behavior (BLB) is the independent variable in models (a) and (f) while financial freedom index (FI) is the independent variable in models (b) and (d). In models (c) and (e), per capita GDP growth (GDPGPC) is the independent variable. The diagnostic test reported include; (1) Wald χ^2 for the joint significance of instruments, (2) the instrument count, (3) p-values of the Arellano-Bond test for first (AR(1)) and second (AR(2)) order serial correlation in the residuals where the null hypothesis is that there is no serial correlation (4) p-value of the Hansen test of over identifying restrictions with the null hypothesis being that instruments are exogenous.

Table 6.5 shows that there are variations in the nature and direction of the nexuses between financial integration, bank lending behavior and economic growth across Africa's sub-regional markets. First, the results in column (a) and (c) of Table 6.5 lends support to the "feedback" hypothesis in the EAC sample. This is because the evidence in column(a) shows that for the period 2007-2014, bank lending behavior (BLB) negative Granger-causes per capita GDP growth among EAC member countries and in column (c), the study finds that per capita GDP growth negative Granger-causes bank lending behavior in the EAC sub-region. This suggests that increases in bank lending (per capita GDP) in previous years have a significant negative effect on per capita GDP growth (bank lending) in currents years in the EAC. This finding is consistent with the findings of Demetriades and Hussein (1996), Kakilli et al. (2009), Lee and Chang (2009), Wolde-Rufael (2009) and Pradhan et al. (2014a).

However, the results for the AMU, ECCAS and ECOWAS sub-regions support the "supply-leading hypothesis" and are consistent with earlier studies by Hsueh et al. (2013), Menyah et al. (2014), and Pradhan et al. (2014a: b). This is because the study finds that for the period 2007-2014, bank lending behavior (BLB) negative Granger-causes per capita GDP growth in the AMU sample but positive Granger-causes per capita GDP growth in the ECCAS and ECOWAS samples.

Table 6.5: Causality between financial integration, bank lending and economic growth: Sub-regional analysis

Dep. Variable	GDPGPC		BLB		FI	
Models	(a)	(b)	(c)	(d)	(e)	(f)
Panel 2: AMU						
$GDPGPC_{t-1}$	0.197(0.152)	**-0.565***(0.056)**	0.081(0.071)		0.008(0.010)	
BLB_{t-1}	**-3.858***(0.528)**		-0.484(0.345)	**0.378**(0.079)**		-0.006(0.013)
FI_{t-1}		**0.855**(0.338)**		**0.482*(0.293)**	**0.244***(0.038)**	**0.198*(0.104)**
GMM criterion	0.813	0.776	0.813	0.761	0.776	0.761
Observations	11	12	11	23	12	23
Panels	4	4	4	5	4	5
Hansen	0.708	0.676	0.708	0.132	0.676	0.132
Panel 3: EAC						
$GDPGPC_{t-1}$	-0.080(0.143)	0.097(0.141)	**-0.069*(0.037)**		**-0.012**(0.004)**	
BLB_{t-1}	**-2.346***(0.547)**		**0.969***(0.189)**	**0.910***(0.121)**		-0.061(0.094)
FI_{t-1}		8.632(7.467)		**0.576*(0.295)**	1.919e-4(0.131)	**2.954***(0.362)**
GMM criterion	0.55	0.482	0.55	0.411	0.482	0.411
Observations	21	21	21	27	21	27
Panels	5	5	5	5	5	5
Hansen	0.482	0.604	0.482	0.520	0.604	0.520
Panel 4: ECCAS						
$GDPGPC_{t-1}$	**0.579***(0.104)**	**0.182**(0.078)**	-0.015(0.066)		-0.003(0.003)	
BLB_{t-1}	**1.554***(0.486)**		**1.433***(0.179)**	**1.401***(0.151)**		-0.017(0.016)
FI_{t-1}		**-7.394**(2.519)**		-0.505(1.623)	**0.831***(0.126)**	-0.302(0.263)
GMM criterion	0.926	0.741	0.926	0.545	0.741	0.545
Observations	14	13	14	23	13	23
Panels	6	6	6	6	6	6
Hansen	0.372	0.649	0.372	0.403	0.649	0.403
Panel 5: ECOWAS						
$GDPGPC_{t-1}$	**0.173*(0.089)**	**0.275**(0.087)**	-0.022(0.015)		-0.003(0.012)	
BLB_{t-1}	**2.452**(0.775)**		0.142(0.201)	-0.023(0.643)		-0.025(0.169)
FI_{t-1}		-2.852(2.551)		-0.757(0.674)	0.025(0.096)	0.264(0.225)
GMM criterion	0.215	0.425	0.215	0.204	0.425	0.204
Observations	45	45	45	66	45	66
Panels	12	13	12	13	13	13
Hansen	0.644	0.085	0.644	0.336	0.085	0.336
Panel 6: SADC						
$GDPGPC_{t-1}$	-0.176(0.233)	**0.768**(0.351)**	0.023(0.042)		**0.011**(0.005)**	
BLB_{t-1}	-0.554(0.650)		**0.674***(0.090)**	**0.663***(0.104)**		-0.012(0.026)
FI_{t-1}		4.514(4.442)		-0.186(0.371)	0.006(0.140)	**0.155*(0.085)**
GMM criterion	0.299	0.484	0.299	0.375	0.484	0.375
Observations	38	44	38	54	44	54
Panels	10	11	10	11	11	11
Hansen	0.497	0.460	0.497	0.602	0.460	0.602

Notes: *, **, ***, indicate significance at the 10%, 5% and 1% levels respectively. Bank lending behavior (BLB) is the independent variable in models (a) and (f) while Financial freedom index (FI) is the independent variable in models (b) and (d). In models (c) and (e), per capita GDP growth (GDPGPC) is the independent variable. The diagnostic test reported include; (1) Wald χ^2 for the joint significance of instruments, (2) the instrument count, (3) p-values of the Arellano-Bond test for first (AR(1)) and second (AR(2)) order serial correlation in the residuals where the null hypothesis is that there is no serial correlation (4) p-value of the Hansen test of over identifying restrictions with the null hypothesis being that instruments are exogenous.

These findings suggest that increases in bank lending in previous years had a significant negative effect on per capita GDP growth in currents years among AMU member countries but a significant positive effect on current per capita GDP growth in the ECCAS and ECOWAS sub-regions. The results for the SADC sub-region show that though BLB had a negative effect on per capita GDP growth over 2007- 2014, it was not significant to imply Granger-causality. Also, the study finds that per capita GDP growth has a negative but insignificant effect on bank lending in the ECCAS and ECOWAS samples and a positive but insignificant effect in the AMU and SADC sub-regions.

Column b of Table 6.5 shows that the coefficient of the first lag of financial freedom index (FI) is positive and significant in the AMU sample but negative and significant in the ECCAS sample. This suggest that deeper financial integration positive Granger-causes per capita GDP growth in the AMU sample, supporting the findings of Misati et al. (2015) that deeper financial integration might have positive benefits for the real sector in sub-regional markets even when the broader common market shows no significant benefits. However, the evidence in the ECCAS sample suggest that financial freedom negative Granger-causes per capita GDP growth, lending support to the view that deeper financial integration is anti-growth. This finding is consistent with the work of Ahmed (2016) for 30 Sub-Saharan countries over 1976-2010. Also, the study finds no significant effect of financial integration on GDP growth in the EAC, SADC and ECOWAS sub-regions.

Similarly, column (e) on Table 6.5 shows that increases in per capita GDP growth positive Granger-causes financial freedom in the SADC sample but negative Granger-causes financial freedom in the EAC sample. This suggests that improved economic growth in SADC helps increase financial freedom and the opposite is true for the EAC sample. The results from the other samples show that though per capita GDP has a positive effect on financial freedom in the AMU and a negative effect in the ECCAS and ECOWAS samples, these were not significant to imply Granger-causality.

In column (d) the study finds that financial integration (FI) positive Granger-causes bank lending (BLB) in the AMU and EAC samples. However, these relationships are negative but insignificant in the other sub-regional markets. This suggests that greater financial freedom in previous years increases bank lending in subsequent years in the AMU and EAC sub-regions. These findings support the theory that financial integration increases financial sector development and bank lending across countries in a common market and are consistent with the findings of Ahmed (2016).

Following the work of Mora and Logan (2012) and Pradhan et al. (2014), the study augments the findings of the Holtz-Eakin et al (1998) estimation procedure using Abringo and Love (2016) pVAR model with impulse response function analysis. According to Pradhan et al. (2014), the Holtz-Eakin et al (1998) panel Granger-Causality test provides evidence of the direction of causality between the variables of interest but fails to account for the timing and extent of impulse response of each variable to a shock in the other variables. The study therefore employs the orthogonalized impulse response functions using Sims (1980) Choleski decomposition to orthogonalize the shocks (Mora and Logan, 2012; Abringo and Love 2016) to overcome this shortcoming. The orderings of the variables are indicated in each Figures 6.1 – 6.3 in Appendix 6.C.

Generally, the study finds that for the period 2007-2014, which spanned the entire global financial crisis period, an unexpected shock in economic growth has a positive and significant initial effect on own economic growth and this effect diminishes gradually over the next 4 periods after the shock at which time economic growth returns to a steady state. Similar responses to own shocks are recorded in the sub-regional markets except in the AMU where the initial own-effect response is positive but becomes negative after one period following the shock. This positive to negative response is seen over the next two periods respectively, after which the effect becomes positive, diminishing overtime towards equilibrium. Similar effects were recorded for the effect of bank lending to GDP in the AMU while GDP growth in the sub-region had very marginal responses to financial integration. However, the study finds an insignificant negative response of GDP growth to a shock in bank lending behavior in Africa. Though the initial response was negative, this becomes positive over the 2 periods, falling back to a steady state in the period after. In the EAC, GDP initially responded negatively to financial integration, but the effect turns positive after one period, diminishing gradually towards equilibrium over the period. The opposite is true for the ECOWAS sample while GDP in the SADC sample had an initially negative response to shocks in financial integration, becoming positive after one period and steadily improves marginally overtime. Also, GDP initially responded positively to shocks in bank lending behavior in the EAC, but this becomes negative one period after, returning to a steady positive response thereafter overtime. In ECOWAS, the initially negative response of GDP to shocks in bank lending turns positive after 1.5 periods and gradually returns to a steady state by the 3rd period.

6.5 Conclusions

Financial sector development and increased bank lending have clear benefits for economic growth. However, achieving steady and speedy economic growth has proven elusive, for even the most advanced economies. The chapter examines the causal nexus between financial integration, bank lending behavior and economic growth in 47 African economies and compare the results across five regional economic communities over 2007-2014. The results of the convergence analysis show that financial integration is largely harmonizing the lending behavior of banks in Africa and all five sub-regional blocs studied. It has also reduced the inter-country variations in GDP in Africa, especially in the EAC and ECOWAS sub-regions. The study also finds that though no significant causal relationship exists between financial integration, bank lending and economic growth in Africa, evidence from the sub-regional blocs supports a causal role of financial integration and bank lending on economic growth. The study finds evidence supporting the feedback hypothesis in the East African Community (EAC) while the evidence from the AMU, ECCAS and ECOWAS sub-regions support the "supply-leading" hypothesis. Similarly, the study found evidence supporting the positive role of financial integration in the AMU sub-region and the negative effect of financial integration in the ECCAS sub-region. The results also support a positive relationship between financial integration and bank lending behavior in AMU and EAC banking sectors.

The findings of the study have important policy and practical implications for Africa and other developing regions. First, the significant variations in the effects of financial integration on bank lending behavior and economic growth shows the dynamic nature of African banking markets and highlights the need for segregation in policy formulation and implementation. Also, the significant role played by bank lending behavior and the sub-regional variations these relationships all point to the need for tailoring regulatory interventions aimed at promoting higher bank lending in Africa to suit conditions in the various rucks of financial integration projects (RECs) in Africa. However, the desire for harmonious economic growth can still be achieved in the long run if these policy initiatives are carried out with the view of bringing to par the regulatory and other macroeconomic factors that influence banking behavior and output growth in each sub-region. This will help promote inter-REC collaborations that will foster long-run economic growth optimization through effects on the bank lending channel of financial integration in Africa.

References

Abrigo, M. R. M. and Love, I. (2016). Estimation of panel vector autoregression in Stata. *The Stata Journal*, 16(3), 778–804

Affinito, M. (2011). Convergence clubs, the Euro-area rank and the relationship between banking and real convergence. *Bank of Italy Temi di discussione (Working Paper)* No. 809.

African Development Bank (2010). Financial sector integration in three regions of Africa: How regional financial integration can support growth, development and poverty reduction. Technical Report. Cote D'Ivoire, 1-142.

Ahmed, A.D. (2016). Integration of financial markets, financial development and growth: Is Africa different? *Journal of International Financial Markets, Institutions and Money*, 42, 43-59.

Ahmed, A.D. and Mmolainyane, K.K. (2014). Financial integration, capital market development and economic performance. Empirical evidence from Botswana. *Economic Modelling*, 42, 1-14.

Andrews D. W. K and Lu, B. (2001). Consistent model and moment selection procedures for GMM estimation with application to dynamic panel data models. *Journal of Econometrics*, 101, 123-164.

Ang, J.B. and McKibbin, W.J. (2007). Financial liberalization, financial sector development and growth: Evidence from Malaysia. *Journal of Development Economics*, 84(1), 215–233.

Arellano, M. and Bover, O. (1995). Another look at the instrumental variable estimation of error-components models. *Journal of Econometrics*, 68, 29–51

Badri, A.K. and Sheshgelani, A.P. (2016). Financial development, financial integration and economic growth. *American Journal of Business and Society*, 1(4), 195-199.

Barro, R. and Sala-i-Martin, X. (1991). Convergence across states and regions. *Brookings Papers on Economic Activity*, 1, 107–182.

Barro, R. and Sala-i-martin, X. (2004). Economic growth. Cambridge, MA: *MIT Press*

Beck, T. and Levine, R. (2004). Stock markets, banks, and growth: Panel evidence. *Journal of Banking and Finance*, 28(3), 423–442.

Bojanic, A. N. (2012). The impact of financial development and trade on the economic growth of Bolivia. *Journal of Applied Economics*, 15(1), 51–70.

Bongini, P., Iwanicz-Drozdowska, M., Smaga, P. and Witkowski, B. (2017). Financial development and economic growth: The role of foreign-owned banks in CESEE Countries. *Sustainability*, 9(3), 1-25.

Cappiello, L., Kadareja, A., Sørensen C.K. and Protopapa, M. (2010). Do bank loans and credit standards have an effect on Output? A panel approach for the Euro Area, *European Central Bank Working Paper Series*, No. 1150. January 2010.

Cecchetti, S.G. and Kharroubi, E. (2012). Reassessing the impact of finance on growth. *BIS Working Papers*, No. 381, July 1, 2012. Bank for International Settlements.

Cetorelli, N. and Goldberg, L. (2011**).** Global Banks and International Shock Transmission: Evidence from the Crisis. *IMF Economic Review*, 59, 41–76.

Cheng, S. (2012). Substitution or complementary effects between banking and stock markets: Evidence from financial openness in Taiwan. *Journal of International Financial Markets Institutions and Money*, 22(3), 508–520.

Cucinelli, D. (2015). The impact of nonperforming loans on bank lending behaviour: Evidence from the Italian banking sector. *Eurasian Journal of Business and Economics*, 8(16), 59-71.

De Nicolò, G. and Juvenal, L. (2014). Financial integration, globalization, and real activity. *Journal of financial stability*, 10, 65-75.

Demetriades, Panicos O. and Hussein, K.A. (1996). Does Financial Development Cause Economic Growth? Time-Series Evidence from Sixteen Countries. *Journal of Development Economics*, 51(2), 387-411.

Demirguc-kunt, A. and Levine, R. (2009). Finance and inequality: Theory and evidence. *Policy Research Working Paper Series*, No. 4967. The World Bank, Washington D.C.

Esso, L. J. (2010). Re-examining the finance-growth nexus: Structural break, threshold cointegration and causality evidence from the ECOWAS. *Journal of Economic Development*, 35(3), 57–79.

Fiordelisi, F. and Mare, D. S. (2014). Competition and financial stability in European cooperative banks. *Journal of International Money and Finance*, 45, 1-16.

Frey, L. and Volz, U. (2011). Regional financial integration in Sub-Saharan Africa – An empirical examination of its effects on financial market development. *South African Journal of Economics*, 81(1), 79-117

Gisanabagabo, S. and Ngalawa, H. (2016). Financial intermediation and economic growth: Evidence from Rwanda. *Journal of Economic and Financial Sciences*, 10(2), 253-273

Granger, C. W. J. (1988). Some recent developments in a concept of causality. *Journal of Econometrics*, 39(1-2), 199–211.

Hansen, L. P. (1982). Large sample properties of generalized method of moments estimators. *Econometrica*, 50, 1029–1054.

Hsueh, S., Hu, Y. and Tu, C. (2013). Economic growth and financial development in Asian countries: A bootstrap panel granger causality analysis. *Economic Modelling*, 32(3), 294–301.

Jalil, A., Feridun, M. and Ma, Y. (2010). Finance-growth nexus in China revisited: New evidence from principal components and ARDL bounds tests. *International Review of Economics and Finance*, 19(2), 189–195.

Kakilli Acaravci, S., Ozturk, I. and Acaravci, A. (2009). Financial development and economic growth: Literature survey and empirical evidence from Sub-Saharan African countries. *South African Journal of Economic and Management Sciences* NS, 12(1), 11-27.

Kar, M., Nazlioglu, S. and Agir, H. (2011). Financial development and economic growth nexus in the MENA countries: Bootstrap panel granger causality analysis. *Economic Modelling*, 28(1-2), 685–693

King R. G. and Levine, R. (1993). Finance and growth: Schumpeter might be right. *Quarterly Journal of Economics*, 108, 717-737

Koetter M. and Wedow M. (2010). Finance and Growth in a Bank-Based Economy. *Journal of International Money and Finance*, 29(8), 1529-1545.

Kouki, S. and Rezgui, S. (2017). The impact of financial integration on economic growth Case of Maghreb countries. *Archives of Business Research*, 5(3), 70-79.

Ladime, J., Sarpong Kumankoma, E. and Osei, K. A. (2013). Determinants of bank lending behavior in Ghana. *Journal of Economics and Sustainable Development*, 4(17), 42-48.

Lane, P.R. (2012). The European sovereign debt crisis. *Journal of Economic Perspectives*, 26(3), 49-68.

Law, S. H. and Singh, N. (2014). Does too much finance harm economic growth? *Journal of Banking and Finance*, 41, 36–44.

Lee, C. and Chang, C. (2009). FDI, financial development and economic growth: International evidence. *Journal of Applied Economics*, 12(2), 249–271.

Levine, R. (1997). Financial development and economic growth: Views and agenda. *Journal of Economic Literature*, 35, 688-726.

Lucas, R. (1988). On the mechanics of economic development. *Journal of Monetary Economics*, 22(1), 3–42.

Marchettini, D., Mecagni, M. and Maino, R. (2015). Evolving banking trends in Sub-Saharan Africa: Key Features and Challenges. IMF Staff Paper Series, African Departmental Paper No. 15/8, *International Monetary Fund*, Washington D.C.

Masati, R.N., Ighodaro, C., Were, M. and Omiti, J. (2015). Financial integration and economic growth in the COMESA and SADC regions. *Journal of African Business*, 16(1–2), 109–127

Mathenge, N. and Nikolaidou, E. (2018). Financial structure and economic growth: Evidence from Sub-Saharan Africa. *Economic Research Southern Africa (ERSA) Working Paper* No. 732. February 2018.

McKinnon, R. (1973). Money and Capital in Economic Development. *The Brookings Institution*, Washington DC.

Menyah, K., Nazlioglu, S. and Wolde-Rufael, Y. (2014). Financial development, trade openness and economic growth in African countries: New insights from a panel causality approach. *Economic Modelling*, 37(2), 386–394.

Mora, N. and Logan, A. (2011). Shocks to bank capital: Evidence from UK banks at home and away. *Applied Economics*, 49(9), 1103-1119.

Moshirian, F. and Wu, Q. (2012). Banking industry volatility and economic growth. *Research in International Business and Finance*, 26(3), 428–442.

Ngalawa, H. and Viegi, N. (2011). Dynamic effects of monetary policy shocks in Malawi. *South African Journal of Economics*, 79(3), 224-250.

Njoroge, L. (2010). The impact of regional integration on economic growth: Empirical evidence from COMESA, EAC and SADC trade blocs. *American Journal of Social and Management Sciences*, 1(2), 150-163.

Nyantakyi, E.B. and Sy, M. (2015). The banking systems in Africa: Main facts and challenges. *Africa Economic Brief*, 6(5), 1-16.

Nzioka, O.M. (2017). Investigating the relationship between financial integration and economic growth in the East African Community. *European Scientific Journal*,13(19), 1857 – 7881

Odhiambo, N. M. (2010). Finance-investment-growth nexus in South Africa: An ARDL bounds testing procedure. *Economic Change Restructuring*, 43(3), 205–219.

Ojeaga, P., Odejimi, O., Okhiku, J. and Ojeaga, D. (2013). Does commercial bank lending incite growth? The impact of commercial lending on real sector growth in Nigeria. *Ekonomika Management Inovace Journal Olomouc*, University College Olomouc, Czech Republic. ISSN ISSN 1804-1299, 3-12.

Panopoulou, E. (2009). Financial variables and Euro area growth: A non-parametric causality analysis. *Economic Modelling*, 26(6), 1414–1419.

Petkovski, M. and Kjosevski, J. (2014). Does banking sector development promote economic growth? An empirical analysis for selected countries in Central and South Eastern Europe. *Economic Research-Ekonomska Istraživanja, 27*(1), 55-66.

Pradhan, R.P., Arvin, M.B., Hall, H.H. and Bahmani, S. (2014a). Causal Nexus between economic growth, banking sector development, stock market development, and other macroeconomic variables: The case of ASEAN countries. *Review of Financial Economics*, 23, 155-173

Pradhan, R. P., Arvin, M. B., Norman, N. R., and Nishigaki, Y. (2014b). Does banking sector development affect economic growth and inflation? A panel cointegration and causality approach. *Applied Financial Economics*, 24(7), 465–480.

Robinson, J. (1952). The generalization of the general theory; in "The rate of interest and other essays". *MacMillan*, London.

Romer, P. M. (1986). Increasing returns and long-run growth. *Journal of Political Economy*, 94(5), 1002-1037.

Saafi, S., Mohamed, M.B.H. and Doudou, M.B. (2016). Causal nexus between financial integration and economic growth: Does nonlinearity matter? *Journal of Economic Integration*, 31(4), 817-854.

Shaw, E.S. (1973). Financial deepening in economic development. *Oxford University Press*, New York.

Shijaku, G. (2017). Bank stability and competition: Evidence from Albanian banking market. *Eurasian Journal of Business and Economics*, 10(19), 127-154.

Sims, C. (1980). Macroeconomics and reality, Econometrica, 48, 1–49.

Solow R.M. (1956). A contribution to the theory of economic growth. *Quarterly Journal of Economics*, 70(1), 65–94.

Standley, S. (2010). What are the determinants of financial market development in Sub-Saharan Africa? *Africa's Financial Markets*, Issue 5 (March 2010), 17-19.

Swan, T. W. (1956). Economic growth and capital accumulation. The *Economic Record, 32*(2), 334–361.

Swamy, V. and Sreejesh, S. (2013). Financial instability, uncertainty and banks' lending behavior. *International Journal of Banking and Finance*, 9(4), 74-95.

Wolde-Rufael, Y. (2009). Re-examining the financial development and economic growth nexus in Kenya. *Economic Modelling*, 26(6), 1140–1146.

World Bank Group (2016). World development indicators (*WDI*) and Global Financial Development (*GFDD*) databases. World Bank, Washington DC.

Wu, J., Hou, H. and Cheng, S. (2010). The dynamic impacts of financial institutions on economic growth: Evidence from the European Union. *Journal of Macroeconomics*, 32(3), 879–891.

Yartey, C.A. and Adjasi, C.K. (2007). Stock market development in Sub-Saharan Africa: Critical issues and challenges. *IMF - Working* Paper No. 07/209, International Monetary Fund, Washington DC.

Yartey, C. A. (2008). The determinants of stock market development in emerging economies: Is South Africa different. *IMF Working Paper* No. WP/08/32 (pp. 1–31). International Monetary Fund, Washington DC.

Appendices

Appendix 6.A: Pairwise correlation matrix

Variable	**GDPGPC**	**FI**	**BLB**
Panel 1: Africa			
GDPGPC	1.000		
FI	**-0.140****	1.000	
BLB	-0.097	**0.385*****	1.000
Panel 2: AMU			
GDPGPC	1.000		
FI	-0.237	1.000	
BLB	-0.011	**0.623*****	1.000
Panel 3: EAC			
GDPGPC	1.000		
FI	**0.479****	1.000	
BLB	**-0.336****	-0.138	1.000
Panel 4: ECCAS			
GDPGPC	1.000		
FI	-0.267	1.000	
BLB	-0.253	**0.565*****	1.000
Panel 5: ECOWAS			
GDPGPC	1.000		
FI	-0.152	1.000	
BLB	**-0.224****	**0.381*****	1.000
Panel 6: SADC			
GDPGPC	1.000		
FI	-0.185	1.000	
BLB	-0.087	**0.409*****	1.000

N**otes**: **, *** indicate significance at the 5% and 1% levels respectively. GDP is per capita GDP growth; BLB is the domestic credit to private sector by banks and FI is the financial freedom index.

Appendix 6.B: Summary of directions of short-run Granger-causality

Direction of relationship	Causal nexus tested in the model		
	FI vs. BLB	**FI vs. GDPGPC**	**BLB vs. GDPGPC**
Direction of Relationship observed in Africa	NA	NA	NA
Direction of Relationship observed in AMU	FI => BLB	FI => GDPGPC	BLB => GDPGPC
Direction of Relationship observed in EAC	FI =>BLB	FI <= GDPGPC	BLB <=> GDPGPC
Direction of Relationship observed in ECCAS	NA	FI => GDPGPC	BLB => GDPGPC
Direction of Relationship observed in ECOWAS	NA	NA	BLB => GDPGPC
Direction of Relationship observed in SADC	NA	FI <= GDPGPC	NA

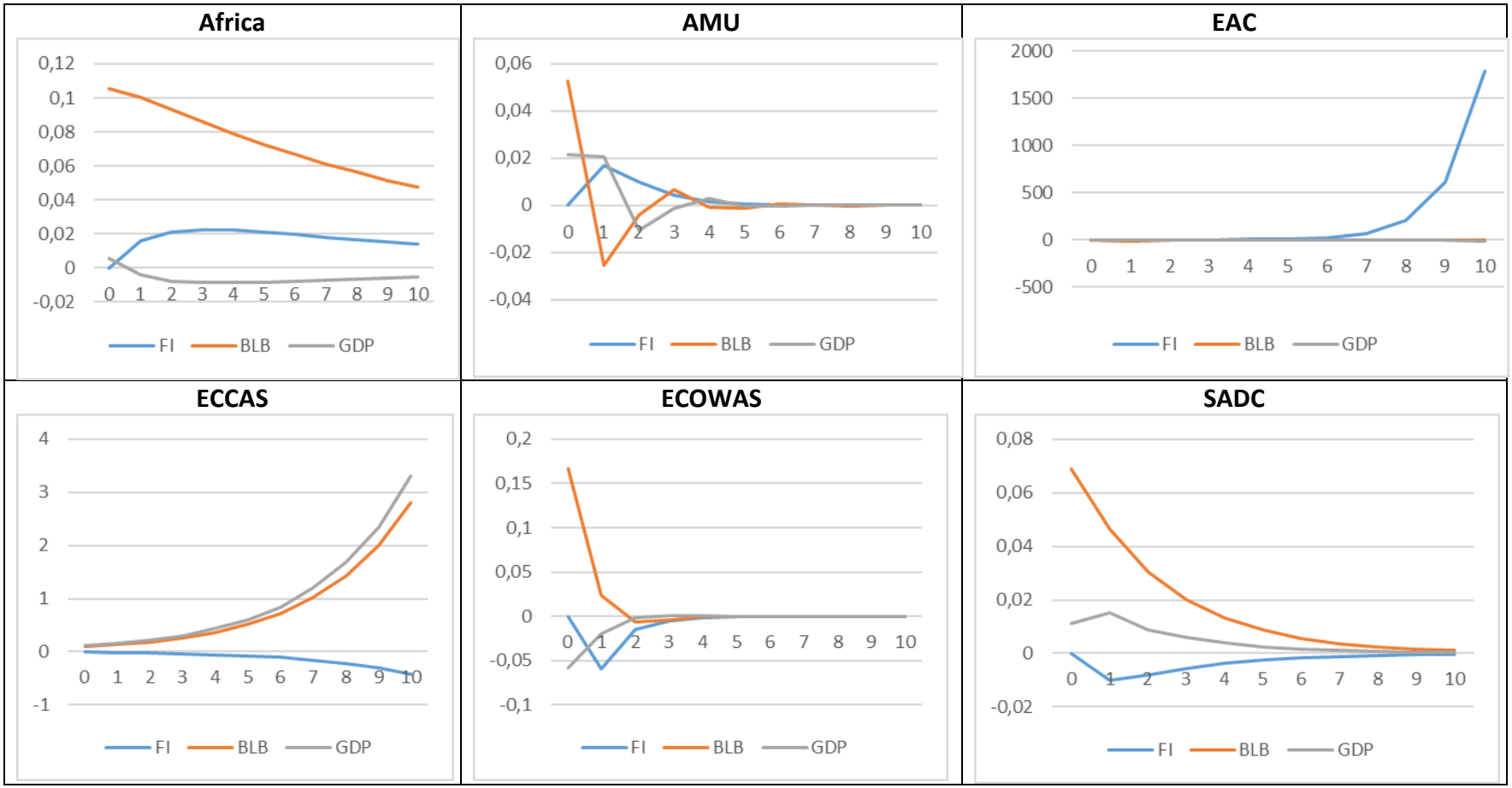
Notes: X => Y means unidirectional causality from variable X to Variable Y; X <= Y means unidirectional causality from variable Y to Variable X; X <=> Y means bidirectional causality between variables X and Y; NA means No causality between X and Y.

Appendix 6.C: Figures showing orthogonalized impulse responses of variables to Cholesky one S.D. innovations

Figure 6.1: Response of GDP to Cholesky one standard deviation innovations

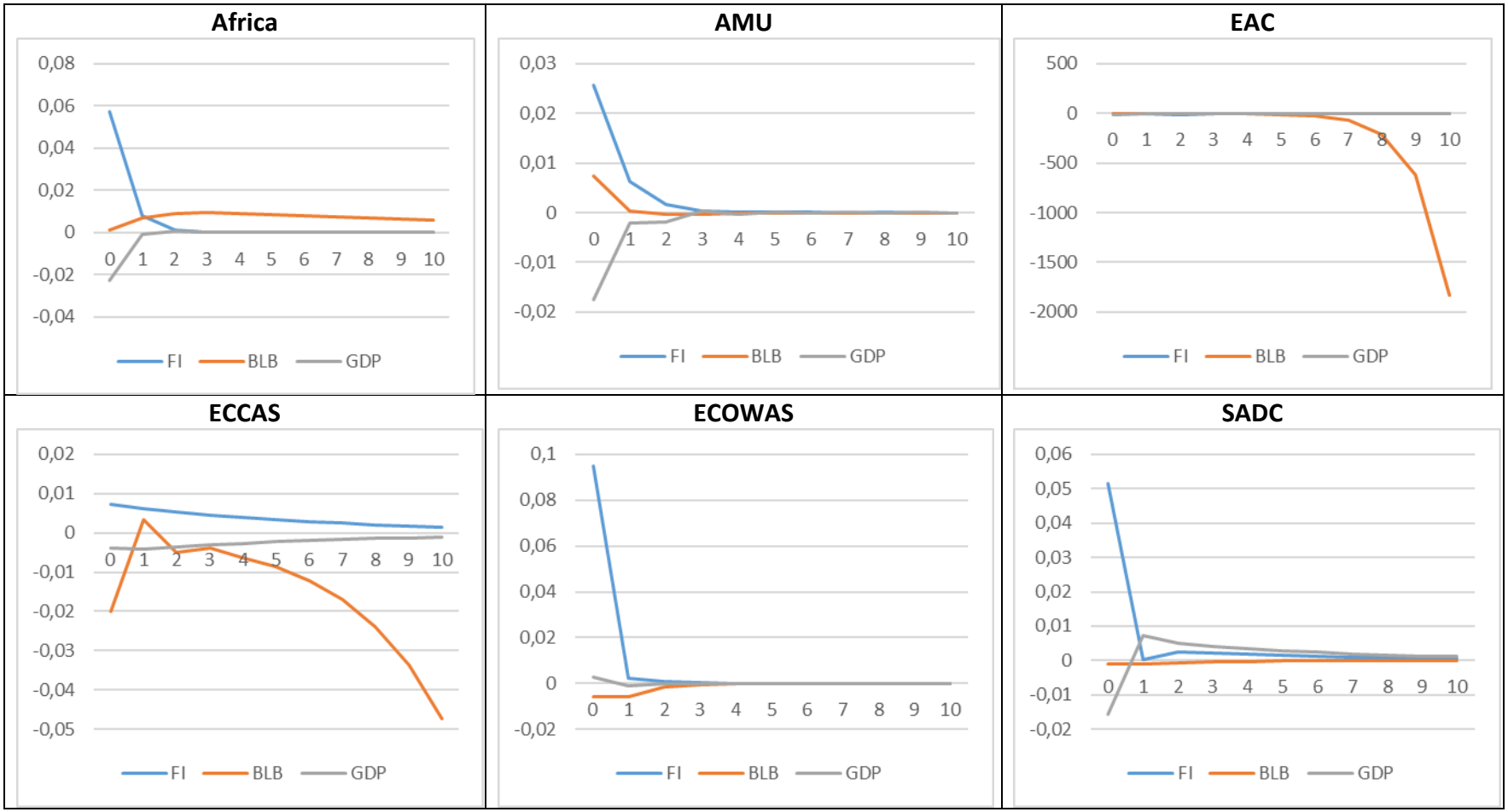
Notes: The PVAR estimation was done using one lag of each variable and the external shocks are estimated using Choleski decomposition. GDP represents per capita GDP growth. The by option is year: scale while variable ordering is GDP, BLB and FI and the series are in logs and time-demeaned to control for time effects. We also used 200 Monte Carlo draws to obtain the error brands. Following Pradhan et al. (2014), we assume that the impulse response is statistically significant where the confidence brands do not straddle the line at zero.

Figure 6.2: Response of BLB to Cholesky one standard deviation innovations



Notes: The PVAR estimation was done using one lag of each variable and the external shocks are estimated using Choleski decomposition. GDP represents per capita GDP growth. The by option is year: scale while variable ordering is GDP, BLB and FI and the series are in logs and time-demeaned to control for time effects. We also used 200 Monte Carlo draws to obtain the error brands. Following Pradhan et al. (2014), we assume that the impulse response is statistically significant where the confidence brands do not straddle the line at zero.

Figure 6.3: Response of FI to Cholesky one standard deviation innovations



Notes: The PVAR estimation was done using one lag of each variable and the external shocks are estimated using Choleski decomposition. GDP represents per capita GDP growth. The by option is year: scale while variable ordering is GDP, BLB and FI and the series are in logs and time-demeaned to control for time effects. We also used 200 Monte Carlo draws to obtain the error brands. Following Pradhan et al. (2014), we assume that the impulse response is statistically significant where the confidence brands do not straddle the line at zero.

CHAPTER SEVEN
CONCLUSIONS AND POLICY IMPLICATIONS

7.1 Introduction

Financial integration is viewed as one of the important drivers of financial sector development, credit expansion and economic growth. Financial integration provides a means of capital and technology transfers across countries to enhance output growth. However, the effect of financial integration on financial market participation, capital mobility and cross-border banking offer both great opportunities and threats to local banking systems and the general economy. This thesis empirically examines the nexus between financial integration, bank performance and economic growth in Africa and compares the findings across five major regional economic communities in Africa. Specifically, the thesis is a collection of seven chapters, of which four empirically examine the nexus between financial integration, bank performance and economic growth in Africa using secondary data from a variety of sources over the period 2007-2014.

Chapter one introduces the research problem and objectives while Chapter two presents an overview of financial integration and the financial system in Africa and the five regional economic communities. In the first empirical chapter of Chapter three, the thesis examines the relationship between both *de jure* and *de facto* financial integration and bank profitability using the two-step system GMM technique. In Chapter four, the study proceeds to address the nexus between financial integration, competition and bank risk-taking behavior, controlling for the effect of quality institutions and other factors. Chapter four also tests the so-called MMR theory of a U-shaped relationship between competition and risk-taking behavior in African banking systems.

In Chapter five, the thesis employs the Stochastic Frontier Analysis technique to estimate measures of cost and profit efficiency in Africa and five sub-regional markets and tests the evolution of bank competition and efficiency using trend as well as β and σ convergence analysis. Also, Chapter five employs panel data Granger-causality analysis to test both the 'Quiet-Life' hypothesis and 'Efficient stricture' hypothesis in Africa and the five sub-regional markets. In Chapter six, the thesis empirically examines bank lending and per capita GDP convergence as well as the causal nexus between financial integration, bank lending behavior and economic growth in Africa and five regional economic communities using panel vector autoregressive (PVAR) techniques. The thesis ends with Chapter seven, which presents a summary of the key findings of the thesis and discusses the major practical and policy implications of the findings. Chapter

seven also summarizes the contributions made by the thesis to the empirical literature on financial integration, bank performance and economic growth. Lastly, the thesis discusses the limitations of the study and makes some proposals for future research agenda.

7.2 Summary of key findings

The key findings of the empirical chapters of the thesis are summarized as follows:

Financial integration and bank profitability: The empirical investigation reveals that increased financial integration has a significant positive effect on overall bank profitability in Africa. More specifically, the study finds that financial freedom, as well as international and regional cross-border banking activities, has significantly increased the profitability of banks across Africa. A possible explanation could be that, given Africa's banking markets are underdeveloped and highly concentrated, deeper financial integration improves bank efficiency and competitive pressure from foreign banks participation forces domestic banks to explore new product, diversification and expansion opportunities for greater profitability. Besides, the findings suggest that though higher cost is associated with lower return on assets, the effect on overall bank profitability is positive. This finding is significant because it suggests that in underdeveloped banking markets, rising competition from deeper financial integration might require banks to increase their cost of operations for technology, diversification, expansion, and advertising activities to enhance their overall profitability. This also shows the benefits of increased spending on overall bank profitability in the face of deeper financial integration and rising competition.

However, a comparison of the results across five regional economic communities of Africa reveals that these benefits are not uniform across all sub-regional markets. The study finds no significant effect of either *de jure* or *de facto* financial integration on bank profitability in the AMU, reflecting the region's low level of financial freedom and cross-border banking activities. In the EAC, greater financial freedom and regional cross-border banking improves bank profitability while foreign direct investment, and foreign bank participation proves to have positive and significant benefits for bank profitability in the ECCAS sub-region. In the ECOWAS sub-region, the study finds that financial freedom and foreign direct investment have positive and significant effects on bank profitability while the only measure of financial integration which has a significant effect on bank profitability in the SADC region, foreign direct investment, inversely affects bank profitability. The study also finds that in the EAC and SADC sub-regions, diversification plays a positive and significant role while competition is significant and negative on bank profitability in the EAC. Also,

banks in Africa tend to benefit significantly from the high inflation regimes in most African countries. However, at the sub-regional level, the study found that the effect of inflation on bank is predominantly negative. These sub-regional variations have always been a major challenge for policy makers in Africa and a hindrance to broad-based regulation and policy direction for the African continent.

Financial integration, competition and bank risk-taking nexus: The results on the direct effect of financial integration on bank risk-taking behavior support the integration-fragility theory in Africa, especially in the East African Community. However, in the AMU, the evidence supports the financial integration-stability theory. Also, the evidence on the effect of competition on bank risk-taking behavior support the MMR theory, indicating that bank competition increases bank risk-taking behavior, but beyond a certain threshold, further rise in bank competition reduces bank risk-taking behavior in Africa and all its sub-regional markets. The findings of the interaction between financial integration and competition suggest that competition changes from increased financial integration enhance bank stability in Africa. This suggests that African economies are unable to fully enjoy the stability benefits of financial integration due to the lack of competitiveness in their banking systems. The results further suggest that control of corruption has a significant positive effect on bank z-scores in the SADC banking sector but a significant negative effect in the AMU banking system. Also, regulatory quality has a significant positive effect on bank non-performing loans in Africa, especially in the ECOWAS and SADC sub-regions. In addition, management quality, capitalization and loan quality are also identified as significant determinants of bank stability in Africa and all its sub-regional markets.

Financial integration, competition and efficiency nexus: Several significant issues emerge from the empirical analysis in this chapter. First, the findings suggest that the period 2007-2014 saw a significant reduction in bank market power and a gradual rise in bank competition in Africa and the five regional economic communities studied. Also, the convergence of competition and bank cost and profit efficiency in all samples provide evidence of the positive benefits of financial integration for banking sector harmonization in emerging markets. The findings of the Granger-causality tests support the 'Quiet-life' hypothesis in Africa, especially in the EAC banking sector. However, the 'Quiet-life hypothesis is rejected in the AMU and ECCAS sub-regions. Also, the results of reverse causality running from cost efficiency to bank competition suggest that increases in bank cost efficiency promotes bank monopoly power in Africa, especially in AMU and SADC banking markets. These findings provide evidence of the uniqueness of the causal nexus between bank competition and bank efficiency across the sub-regional markets of Africa.

Financial integration, bank lending behavior and economic growth nexus: The findings of the β and σ convergence tests shows a reduction in the inter-country variations in bank lending and per capita GDP growth in Africa and the gradual convergence of lending and GDP performance towards the African average. This suggests that financial integration is largely harmonizing the rate of financial market development and bank lending activities across Africa and its sub-regional markets. It has also reduced the inter-country variations in GDP in Africa, especially in the EAC and ECOWAS sub-regions. Though no significant causal relationship exists between financial integration, bank lending and economic growth in Africa, evidence from the sub-regional markets supports a causal role of financial integration and bank lending on economic growth. The study finds evidence supporting the feedback hypothesis in the East African Community (EAC) while the evidence from the AMU, ECCAS and ECOWAS sub-regions support the "supply-leading" hypothesis. Similarly, the study finds evidence supporting the positive role of financial integration in the AMU sub-region and the negative effect of financial integration in the ECCAS sub-region. The results also support a positive relationship between financial integration and bank lending behavior in AMU and EAC banking sectors. This suggests that concentration of financial integration efforts at the regional economic communities' level is yielding positive results for some sub-regions whiles other sub-regions have negative outcomes, highlighting the need for peer-learning and tailored interventions for net benefits.

7.3 Policy implications and recommendations

The findings of the thesis exude several practical and policy implications. First, from a development finance perspective, the study findings support the view that continuous financial integration in Africa and other emerging economies is beneficial for the profitability and general performance of banks and the economy at large. However, the disparities recorded among five key regional economic communities of Africa suggest that wholesale integration policies will not auger well for Africa, unless they are tailored to fit the environmental settings of the various regional economic communities. Specifically, policy makers, regulators and bank managers should work hand in hand to promote greater financial freedom in Africa, especially in the EAC and ECOWAS banking sectors as this has a significant positive impact on bank profitability in these regions. Besides, despite being an insignificant determinant of bank profitability in the AMU, ECCAS and SADC sub-regions, its impact is generally positive. The low levels of financial freedom recorded in the AMU and ECCAS needs to be improved to allow banks in these markets harness the profitability benefits of greater financial sector liberalization, especially in countries like Libya, Algeria

(AMU), the Democratic Republic of Congo and Central African Republic (ECCAS). In the SADC sub-region, countries like Zimbabwe and Seychelles also need to boost their levels of financial freedom towards convergence at the SADC average. These improvements will allow for greater intra-REC collaborations and cross-border banking activities for enhanced bank profitability in each sub-regional banking market.

Also, the level of FDI inflows in Africa should be boosted if significant benefits are to be enjoyed by banks and the general economy from FDI inflows. This is especially important for the ECCAS sub-region, where the profitability of banks is significantly improved by higher FDI inflows despite being the least receiver of FDI inflows in Africa. In SADC, FDI inflows should be regulated to curb the negative impact on bank profitability whiles allowing the country to benefit from the technological and other latent benefits of FDI inflows in an economy. In line with this, African governments should adopt policies to encourage more FDI flow into the region while curbing any possible negative effects this might have on their domestic banking sectors. Similarly, the study recommends that policy makers, regulators and bank managers should adopt initiatives that will allow their banking sectors to grow and establish branches in other African economies as regional cross-border banking activities broadly enhances bank profitability in most regions. These initiatives are especially important in the EAC and ECCAS sub-regions. However, in ECOWAS and SADC, despite high regional cross-border banking activities, some of the largest and most developed economies such as South Africa, Mozambique (SADC), Togo and Cape Verde (ECOWAS) are dominated by domestic banks. This could explain the insignificant effect of regional bank assets on bank profitability, highlighting the need for these sub-regions to improve regional cross-border banking activities across all countries to allow them enjoy its benefits. Also, despite the positive effect of inflation on bank profitability in Africa, the sub-regional evidence suggest that African economies need to curb inflation as this negatively affects bank profits and poses a threat to overall economic welfare. Additionally, the significant firm level factors provide bank managers insights in focal areas that need greater attention to ensure greater bank profitability.

Second, the evidence of a U-shaped relationship between competition and bank stability provide regulatory authorities in Africa with the empirical confirmation needed to back a continuous pursuit of deeper financial integration and greater competitiveness in the banking industry despite temporary negative effects this might have on bank stability. Specifically, the study provides empirical support for continuous financial sector liberalization across Africa amid improved institutional quality to allow banks enjoy the stability benefits of a more liberalized and competitive banking sector. However, since the initial effects of a more competitive banking sector may be negative, regulators and bank managers should take steps to manage

the temporary surge in bank fragility. For instance, bank managers should rather pursue efficiency, product innovation and diversification goals in the wake of rising competition rather than exploiting the so-called opportunities for greater risk-taking provided by the underdeveloped nature of African banking systems. The results also suggest that regulatory authorities in Africa should improve the quality of institutions as this further enhances the long-run benefits of greater competition on bank stability. Regulators need to also take steps to increase entrance and participation by both new domestic and foreign banks, especially in the AMU, ECCAS and SADC markets as these markets are dominated by a few large banks. Besides, the evidence suggests that the concurrent pursuit of liberalization and competition goals improves bank stability in Africa.

Similarly, the results of the competition-efficiency nexus analysis suggest that deeper financial integration has a generally positive effect on bank competition and efficiency across the common market, thereby reducing the inter-country variations overtime. This provides incentive for the continuous promotion of financial integration in Africa as it improves both the competitiveness and efficiency of the banking sector. However, the sub-regional variations in the convergence rates of bank competition and efficiency in Africa highlight the need for increased financial integration efforts in sub-regional markets with slower comparative convergence rates to bring their competition and efficiency convergence rates at par with the other sub-regions. For instance, the AMU, ECCAS and SADC markets have a greater bank concentration convergence rates than other regions. The faster rate of market concentration convergence in these markets suggest the need for a general improvement in the competitiveness of these banking markets to enable them enjoy the benefits of greater bank competition. These initiatives will further promote greater harmony among Africa's banking markets and pave the way for broader banking integration in the region, thereby enhancing distributive efficiency for greater economic growth. In addition, evidence of a positive causal effect from competition to bank efficiency in Africa and the EAC support the continuous pursuance of competition goals in Africa for enhanced efficiency. However, the rejection of the so-called "Quiet-Life' hypothesis in the AMU and ECCAS sub-regions suggest that increased competition leads to efficiency losses in these markets and points to the need for regulators and bank managers to seek out new sources of bank efficiency such as greater technology and management quality. Also, the evidence of a positive nexus between efficiency and market power in the AMU and SADC sub-regions suggest that bank managers use their efficiency for market power gains instead of using it for greater diversification and increased lending activities for economic growth. Overall, the pursuit of differentiation strategies by efficient

banks, a reduction in lending rates and a broader scope of lending activities by such banks will be beneficial to investors and the general economy.

The final set of policy issues relate to the nexus between financial integration, bank lending and economic growth. First, the lack of a significant nexus between financial integration, bank lending and economic growth in Africa, despite the presence of significant relationships in the sub-regional markets all point to the fact that overall inter-REC financial integration in Africa is still low. This prevents the region from enjoying the benefits of deeper financial integration and financial market development. Also, there is evidence of significant negative causality running from greater bank lending to economic growth in the AMU and EAC though the benefits are positive and significant in the ECCAS and ECOWAS sub-regions. However, the negative effects could be due to the credit defaults that affected the global financial market during the 2008 crisis. This study therefore recommends that African economies should continue to pursue policies that enhance greater bank lending while taking measures to curb the negative effects of future credit market crisis. Also, countries pursuing expansionary monetary policies should take steps to curb credit defaults as this could reduce economic higher credit risk exposure could reduce economic growth. Overall, the desire for harmonious and speedy economic growth across Africa and other emerging markets can be achieved if these economies tailor their policy initiatives to suit the conditions in their sub-regional markets while pursuing goals to bring to par the regulatory and other macroeconomic factors that influence banking behavior and output growth in each sub-region through peer-learning and inter-REC collaborations.

7.4 Contributions and limitations of the study

The enormous importance of banking intermediaries for the economic growth and development of emerging markets makes the continuous evaluation of their conduct and performance highly critical for policy decision making. Moreover, Africa's drive towards greater financial and economic integration presents banks with opportunities and threats that affect their performance and the economic performance of host countries. This highlights the need for a continuous evaluation of the implications of financial integration for bank activities and economic growth. In view of this, the analysis in this dissertation makes several contributions to the empirical literature on the cost and benefits of financial integration in emerging markets. To the best of the author's knowledge, this thesis presents the first comprehensive comparative assessment of the effects of financial integration on bank performance and economic growth in five major regional economic communities of Africa.

The novelty of the thesis therefore comes in several folds. First, the study extends the vast bank profitability literature by applying principal components analysis to construct a standardized bank profitability index (SBPI) allowing for the broader assessment of bank profitability determinants that fits the interest of a wider spectrum of stakeholder groups (Luo et al., 2017). As far as the author knows, this thesis is the first study to apply a composite indicator of bank profitability to assess it determinants. This is also the first paper to assess the varying roles of *de jure and de facto* measures of financial integration in determining bank profitability in Africa and five regional economic communities.

Second, the thesis presents the first comprehensive comparative assessment of the effects of financial integration on the performance and competitive conduct of banks in Africa. As argued by Mishkin (2009), tailoring integration and other policy initiatives to common markets may be better than wholesale policies as the later may not always lead to the most optimal outcomes. The relevance of understanding the sub-regional differences in the role of financial integration seeks to promote peer-learning and better tailoring of policy initiatives to ensure greater and more harmonious benefits are derived from Africa's on-going financial integration process for growth.

The thesis also presents the first empirical assessment of banking convergence in Africa. To the best knowledge of the author, this thesis is the first to apply the theory of convergence to the banking sector in Africa. In this study, the issue of banking convergence is applied to assess the evolution of bank competition, efficiency and bank lending behaviour from 2007 to 2014 following over three decades of financial sector reforms in Africa. Also, the study departs from the convention in the banking literature on Africa by testing for reverse causality between bank competition and cost efficiency in Africa in a Granger-causality fashion. To the best of the author's knowledge, this is the first study to test both the quiet-life hypothesis and the efficient-structure hypothesis in African banking markets.

The study is also the first to combine the various strands of the finance-growth literature in one study, highlighting the role of both financial integration and bank lending behavior in determining economic growth in emerging markets. The study examines the supply-leading, demand-following and feedback hypotheses using panel vector auto-regressive models for testing Granger-causality. According to Pradhan et al. (2014a), this approach is a seldom used in the finance-growth nexus literature in emerging markets. To the best of the author's knowledge, this is the first study to examine the feedback hypothesis of the finance-growth nexus debate in Africa. The comparison of the findings across sub-regional markets highlights the relative importance of financial integration and banking lending on economic growth across Africa's regional

integration projects (RECs). This understanding is expected to guide the adoption of broad-based policies that will ensure greater and a more harmonious growth performance in African economies across the common market.

Despite these contributions, this thesis has the following limitations. First, the empirical analysis of the thesis is conducted using secondary data and any insights that could be drawn from expert opinions on the issues studied is lost. Also, the study data was limited to the period 2007-2014. This data limitation could not allow the study to conduct a comparative analysis of the period prior to, during and after the recent global financial crisis. This analysis could have enabled the study examine the variations in banks competitive conduct and performance and per capita GDP performance in emerging economies under these three critical periods. Such knowledge could guide regulators on the timing of interventions and needed changes in times of a financial crisis and after. Finally, the findings and recommendations only relate to Africa and the five regional economic communities studied, hence extrapolation of the findings to other emerging economies may be limited due to differences in financial integration policies, regulatory environments and other market conditions.

7.5 Proposed agenda for future research

First, the current study did not assess the effect of financial integration on the competitiveness of the banking sector in Africa. Future research could examine the determinants of bank competition and examine the relationship between financial integration and bank competition in the five regional economic communities. Besides, most retail banking in emerging markets emanate from domestic banks except the few countries identified to be dominated by foreign banks. An understanding of the effects of banking digitalization could prove useful towards a broader comprehension of the effect of technological changes on bank competitiveness, efficiency and profitability. Also, as Africa's stock market development increases and data become more available for more countries, it would be important to examine the effect of financial integration on stock market development.

The effect of financial integration in promoting banking convergence should also be examined into detail. Also, the nexus between other bank performance metrics and economic growth would be an interesting and vital study. This will bring out the vital aspects of bank performance that significantly determine economic growth in Africa. The study also failed to undertake a threshold analysis to provide policy makers

with the details on the threshold, beyond which deeper financial integration negatively affects bank stability. Such a study will guide more specific policy decisions.

On the data limitation, other studies could undertake a comparative study to examine the possible changes in the role of financial integration and other factors in determining the conduct and performance of banks and economic growth in emerging markets. Expert views could also be sought on these issues in emerging markets to ensure a more holistic understanding of the linkages between policy propositions, actual policy decisions and policy outcomes. Such an insight will guide the formulation of more realistic policies and decisions for better outcomes.

References

Luo, D., Dong, Y., Armitage, S. and Huo, W. (2017). The impact of foreign bank penetration on domestic banking sector: evidence from China. *The European Journal of Finance*, 23(7-9), 752-780.

Mishkin, F.S. (2009). Why we shouldn't turn our backs on financial globalization. *IMF Staff Papers*, 56(1), 139-170.

Pradhan, R.U., Arvin, M.B., Hall, J.H. and Bahmani, S. (2014). Causal nexus between economic growth, banking sector development, stock market development, and other macroeconomic variables: The case of ASEAN countries. *Review of Financial Economics*, 23, 155–173.